AMERICAN BUILDER

THE WORLD'S GREATEST BUILDING PAPER

Vol. 41. CONTENTS FOR APRIL, 1926 No. 1.

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Published on the first day of each month by American Builder and Carpenter Co.; Wm. A. Radford, *President, Treasurer and Editor-in-Chief;* Wm. A. Radford, Jr., *Vice-President;* E. L. Hatfield, *Vice-President and General Manager;* Bernard L. Johnson, *Vice-President and Editor;* Roland D. Radford, *Secretary;* S. C. Kellenberger, *Dealer Service;* Paul N. Rothe, *Circulation Manager,* Delbert W. Smith, E. B. Wolfrom, C. R. W. Edgcumbe, L. H. Reich, O. H. Sutter, Cecil W. Blashill, H. P. Sessions, J. J. Dubro, *Advertising Staff.*

Publication Offices;
Radford Building, 1827 Prairie Ave., Chicago
Telephone: Calumet 4770

Eastern Office: 250 Park Ave., New York City
Telephone: Vanderbilt 3185

Entered as second-class matter July 1, 1905, at the Chicago, Ill., under the Act of Congress of Mar[illegible]

SUBSCRIPTION RATES—One year, Uni Mexico, and U. S. Possessions, $2.00; six no copies, 35 cents. Foreign countries, $4.00.

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Some Facts About this April American Builder

One hundred ten thousand copies of 768 pages each. Paper required to print this issue more than 460,000 pounds of paper, or 230 tons—10 carloads.

If each page was placed end to end the strip would reach 16,000 miles and would carpet over 63,000,000 square feet. If the books were piled on top of each other they would be 11,458 feet or 2⅛ miles high.



THE 1926 ANNUAL NUMBER

JUST twenty-one years ago this month the first number of the AMERICAN BUILDER made its appearance. Although very small then as compared with its later growth, it revolutionized building publications, setting a new standard for graphic illustrations, authoritative articles, clean, readable type and attractive presentation. The building industry immediately recognized the merit of this newcomer in the field and responded with their subscriptions, so that right from the start the AMERICAN BUILDER enjoyed by far the largest circulation of any building publication.

This position of leadership has been held without a break up to the present time.

The original paid circulation of 20,000 has grown steadily month by month, and year by year, until with the present issue, our 21st Anniversary Number and our Annual Reference Number for 1926, we are proud to announce a circulation of 100,000 copies.

This April Annual Reference Number for 1926 is a magazine of 768 pages, which is the largest magazine so far as we know, ever issued by any publication in any field. It is 45 per cent larger than our own previous record established in June, 1924.

This present volume is a Library of building designs and plans, an Encyclopedia of helpful information and handy reference data and a complete Buyers' Guide for the business men of the building industry.

Five hundred and eighty different firms manufacturing and selling goods and services to the building industry are represented in these pages. This is a most complete list and its value to our readers is greater because of its size and completeness.

In this book you will find the information you seek on any and every type and brand of building materials, building equipment, contractors' supplies and mechanics' tools. The best and most reliable firms serving the building industry are making announcements in these pages and are inviting our readers to correspond with them and to enter into business relations.

We know these firms to be reliable and we can endorse them to our readers.

How This Book Is Arranged

You will note that the advertising announcements and reference catalog pages in this book are grouped by commodities for your convenience. These groups are indexed along with the editorial contents and building designs on pages 4, 5 and 6.

Then at the back of the book notice the Green Paper BUYERS' GUIDE. There, on pages 719 to 741, are presented the complete lines of every manufacturer represented in this book. This BUYERS' GUIDE is arranged alphabetically by products and under each heading are the names of the various manufacturers of that product. Following the name of each manufacturer is the page number of his advertisement or catalog in this issue so that you can conveniently refer to that page and get additional information.

An alphabetical list of TRADE NAMES is also presented in the Green Paper Section, 742 to 750. This TRADE NAME Directory will often be worth to you more than a ten years' subscription because so often specifications will give a brand name or trade mark without the name and address of the manufacturer. Our TRADE NAME Directory gives that information in complete and convenient form.

Notice in particular the Contractors' Equipment Section on India Tint or Sepia paper stock on pages 523 to 623. Proper labor saving tools and power equipment on the job and in the shop are proved money-makers for the ambitious mechanic and for the contractor and builder. In this complete section of 100 pages we have gathered together for your benefit the latest information and announcements pertaining to the equipment and tools which you will need. Study these pages, make your comparisons and selections.

A valuable editorial section under the title "Handy Reference Data" is presented on pages 623 to 635. We predict that you will often turn to this compilation for desired information.

48 Pages of Building Designs in Colors

One of the unique and exclusive features found only in the AMERICAN BUILDER is our popular department, HOMES IN COLORS. Sixteen pages are presented every month in the AMERICAN BUILDER. For this Annual Number we have also added sixteen pages of Business and Public Buildings in colors, also eight pages of Apartment Homes; and our regular Portfolio of Notable Architecture in duo-tone has been increased from four to eight pages this month.

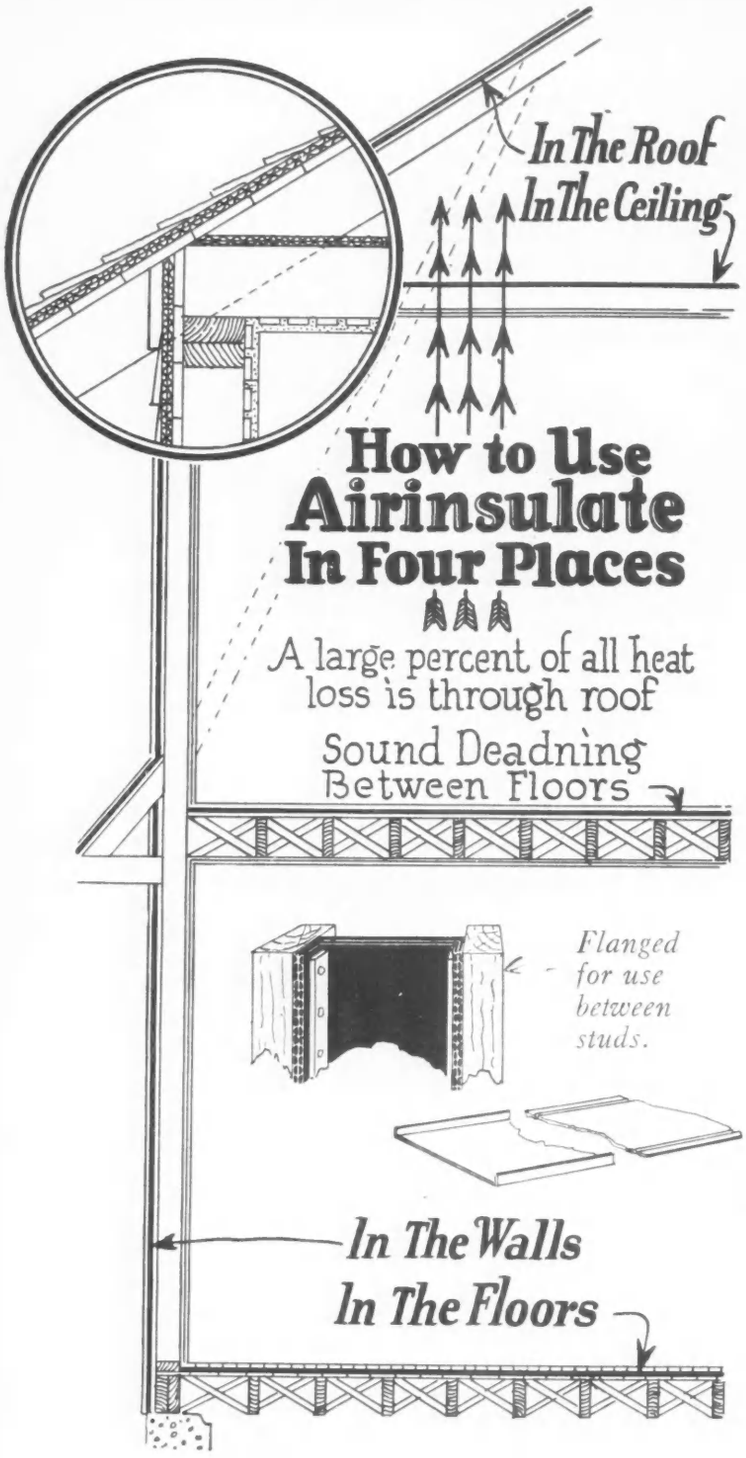
Thus the building designs in this issue, not only in colors but also in the black and white departments, cover your entire range of building activity. Whatever type of building is wanted, you will find it here. Whether homes, apartments, business buildings, public buildings, garages or farm buildings, you will find here attractively worked out some design or idea that will help you to clarify and crystallize your own ideas and be of assistance to your clients and customers.

The Year Book of Building Designs

In connection with this Annual Reference Number of the AMERICAN BUILDER we are also issuing the "AMERICAN BUILDER Year Book of Building Designs" for 1926. This will be a book bound in hard covers and will contain all of the matter presented in this issue of the AMERICAN BUILDER PLUS 320 pages of additional home and building designs. These Year Books are ready for distribution to dealers, building contractors and architects at a nominal price.

Write us regarding this larger collection of designs and more permanent binding which the Year Book will give you.

EDITOR AMERICAN BUILDER.



Airinsulate

TRADE MARK

The Waterproofed Dead Air-Cell Board

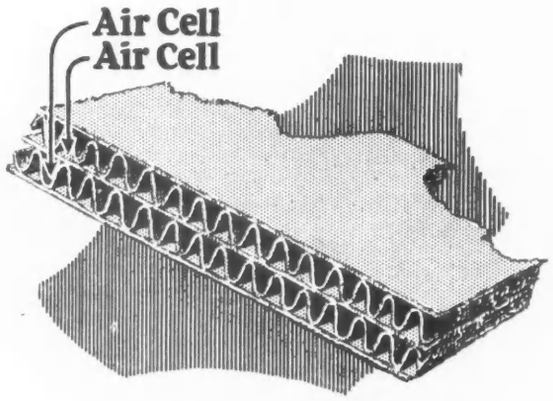
Airinsulate utilizes the dead air principle of insulation, which is the most practical and economical known. Airinsulate costs about one-fourth less than any similar insulating material on the market. Unlike any other insulator, Airinsulate is a 5-ply, wood fibre felt dead air cell constructed board, each ply waterproofed under K. B. process patents by embedding layer of waterproofing compound midway between outer surfaces.

There Is a Definite Trend Toward Insulation

Airinsulate has been manufactured to meet a specific demand. The entire building industry has been looking for a better insulating material at a lower cost and here it is.

Easy to Handle

Airinsulate comes in convenient widths and lengths—32 inches and 48 inches wide, and 7, 8 and 9 feet long. We also make a flanged Airinsulate stock size 18 inches wide and scored 2 inches from each side. This fits between standard studding. You can get Airinsulate delivered to the job as economically as any material known. It is light in weight and self supporting. One nail will hold it in place. This means a saving of time and labor.



Each ply waterproofed under K-B process patents, by embedding layer of water-proofing compound midway between outer surfaces.

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Construction Going Strong

IN spite of a decided drop from January, February's construction contracts reached a very high total, according to F. W. Dodge Corporation. Building and engineering contracts let last month in 37 states, including approximately 90 per cent of the country's total construction, amounted to $389,899,800. The drop from January was 15 per cent; but there was an increase of 25 per cent over February of last year, making last month's figures the highest February total on record. Extreme winter weather conditions probably had a good deal to do with the drop from January.

Included in last month's record were: $178,747,800, or 46 per cent of all construction, for residential buildings; $66,710,800, or 17 per cent, for public works and utilities; $50,176,700 or 13 per cent, for commercial buildings; $40,422,000, or 10 per cent, for industrial buildings, and $20,721,500, or 5 per cent, for educational buildings.

Building and engineering work started during the past two months has amounted to $847,058,400, being an increase of 37 per cent over the amount started in the first two months of last year.

The planning of new work continues at an enormous rate. Contemplated new work reported for the 37 states in February amounted to $861,141,800, an increase of 1 per cent over the amount reported in January and of 25 per cent in the amount reported in February of last year.

✣

The Cost of Poor Construction

ACCORDING to figures furnished by the Better Building Registry, whose engineers have undertaken extensive research work and tests along these lines, heat losses in the average, poorly built homes, over a period of twenty years, amount to more than $4,500. Flimsy construction, the absence of insulating material and weatherstripping, failure to cover steam and furnace pipes, loosely built walls and defective chimney flues and heating plants, cost home owners in Chicago alone more than $50,000,000 a year and throughout the country a total of $450,000,000 a year.

Expressing this in a different way, proper construction which, as compared with poor construction, will cost only a few hundred dollars extra will add $4,500 to value of the average house. Viewed from this angle the poorly built house is not only a risky investment but a certainly losing proposition.

✣

Discouraging Fire Hazards

CINCINNATI, Ohio, has recently made a move in the fight against increasing fire losses which is something distinctly new to this country, although long and effectively used in Germany. Quite a while ago Cincinnati enacted a personal responsibility ordnance covering fires due to the negligence of property owners, but until recently it has been ignored. Finally a case occurred where the property owner had been warned, both by an inspector and by the fire department, to make certain clearance of rubbish from his property. Both warnings were ignored and six months later a fire occurred. The city brought suit to recover the expense involved in fighting the fire and was awarded $500 by a jury.

The extension of such legislation and penalties might well be effective in this country, as it has abroad, in not only forcing property owners to eliminate dangerous rubbish and other fire hazards, but also to build fire safe buildings at the start.

✣

Perpetuating Southern Forests

THE Southern Pine Association has recently issued a statement based on a survey of forest conditions in the South calling attention to what has already been done to perpetuate the southern lumber industry and predicting that there will always be a supply of southern pine sufficient to meet the demand of American consumers and that lumber will always be an important industry in the South. It also points out the error into which some people have fallen in stating that the lumber operators have done nothing to prevent the complete destruction of our forest resources.

As indicating the attitude of the lumber operators it mentions that the Southern Pine Association, at its annual meeting held in March, 1925, adopted a resolution definitely declaring in favor of reforestation and pledging the support and aid of those manufacturers for the movement. It also took definite steps to bring about closer utilization of forest materials, establishing a department to be devoted to greater efficiency in logging and manufacturing methods and to secure more thorough utilization of and conservation of forest products.

A compilation made by the association early in 1925 showed that more than 25 of the larger southern pine manufacturers were practicing forestry or aiding reforestation in some specific and systematic manner and this notwithstanding the fact that in a number of the southern states little or nothing has been done by the public, through legislation or otherwise, calculated to encourage forestry and timber growing.

✣

Safety and Economy

THE campaign for safety and accident prevention, which has been carried on in this country in recent years, has resulted in a great reduction in the rate of both accidental deaths and injuries. In the steel industry, the birthplace of the modern safety movement, the fatalities per million hours worked have decreased 50 per cent in the past 10 years. This is an average of the group of companies doing safety work. Individual companies have reduced the frequency and severity of accidents by 75 and 90 per cent. The direct economic savings have exceeded the cost of the safety work, to say nothing of the improvement in morale.

But in spite of this excellent record, industrial accidents cost the business men of the Unted States more than a billion dollars annually, according to C. B. Scott, president of National Safety Council, who states that most of this loss can be saved as accidents do not happen but are caused by hazards which largely can be eliminated through educational methods and safeguards.

When *Time* Must be Saved

On many new and repair jobs *time* often is of prime importance.

Just as crack trains cross the country in quick *time*, and powerful motor cars cut *time* records, and the U. S. air mail planes almost annihilate *time* to speed up deliveries, so also can *time* be saved to speed up many construction jobs.

In such cases you do not want to wait the time usually required for concrete to gain the desired strength. With the proper materials and methods you do not need to. You can obtain quick-hardening, strong concrete in 3 *days* with standard *Universal* cement, the same quality *Universal* as regularly used, by applying the same methods that thousands of laboratory tests and actual construction experience prove will give the desired results.

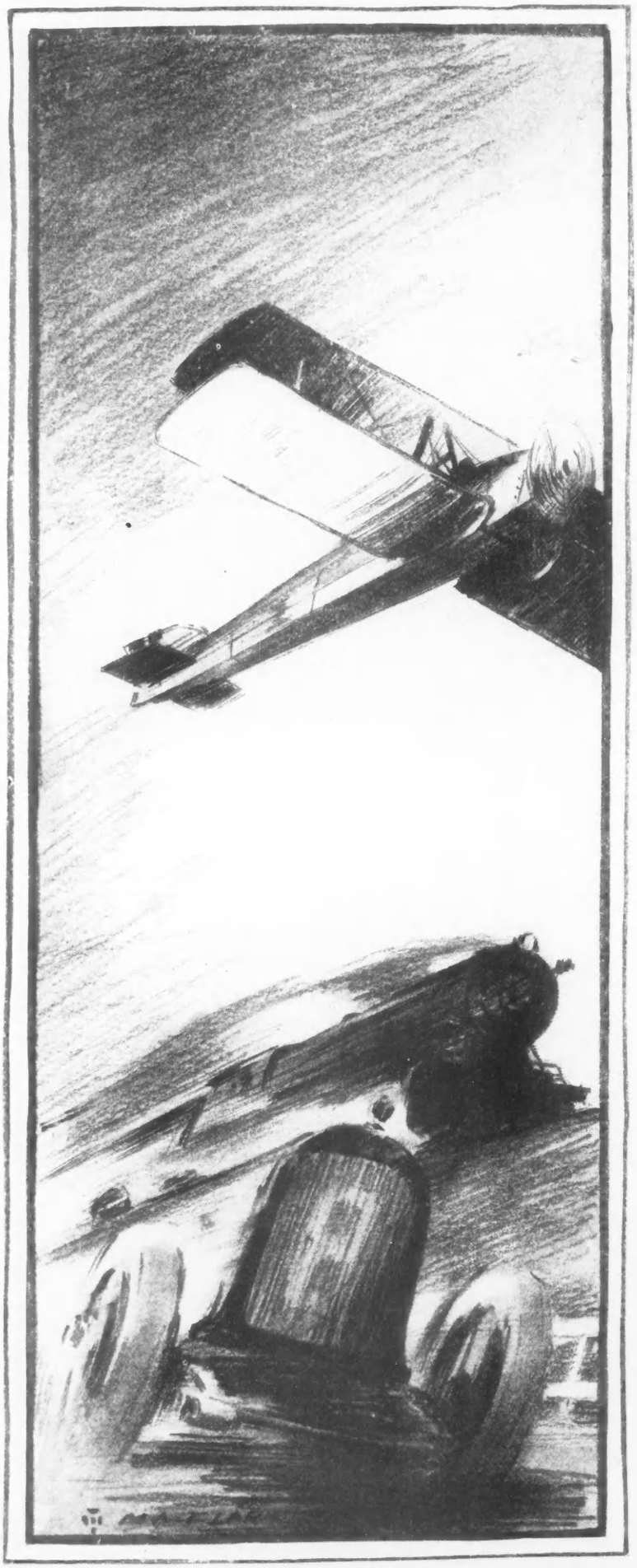
Detailed information on how to obtain quick-hardening strong concrete in 3 *days* with standard *Universal* cement on all jobs "where *time* must be saved" gladly furnished on request to

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Concrete for Permanence





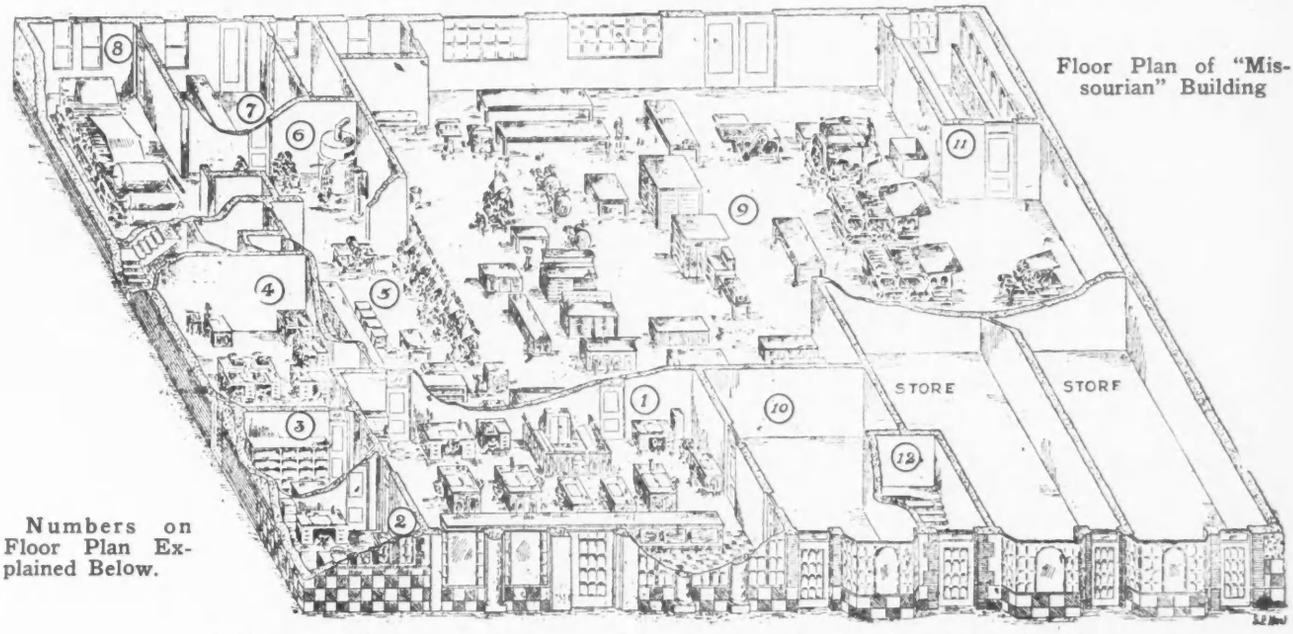
This Newspaper Building Unique In Its Spanish Architecture

Built at Cape Girardeau, Missouri, Where the Spanish Flag Was First Raised West of the Mississippi

THOMAS P. BARNETT, Architect

ON the historic spot where legend says the Spanish flag was raised over the first seat of government west of the Mississippi River, Naeter Brothers, owners and publishers of the "Cape Girardeau Southeast Missourian," Cape Girardeau, Missouri, have erected what is considered the most beautiful, as well as the most typical Spanish building in the Middle West.

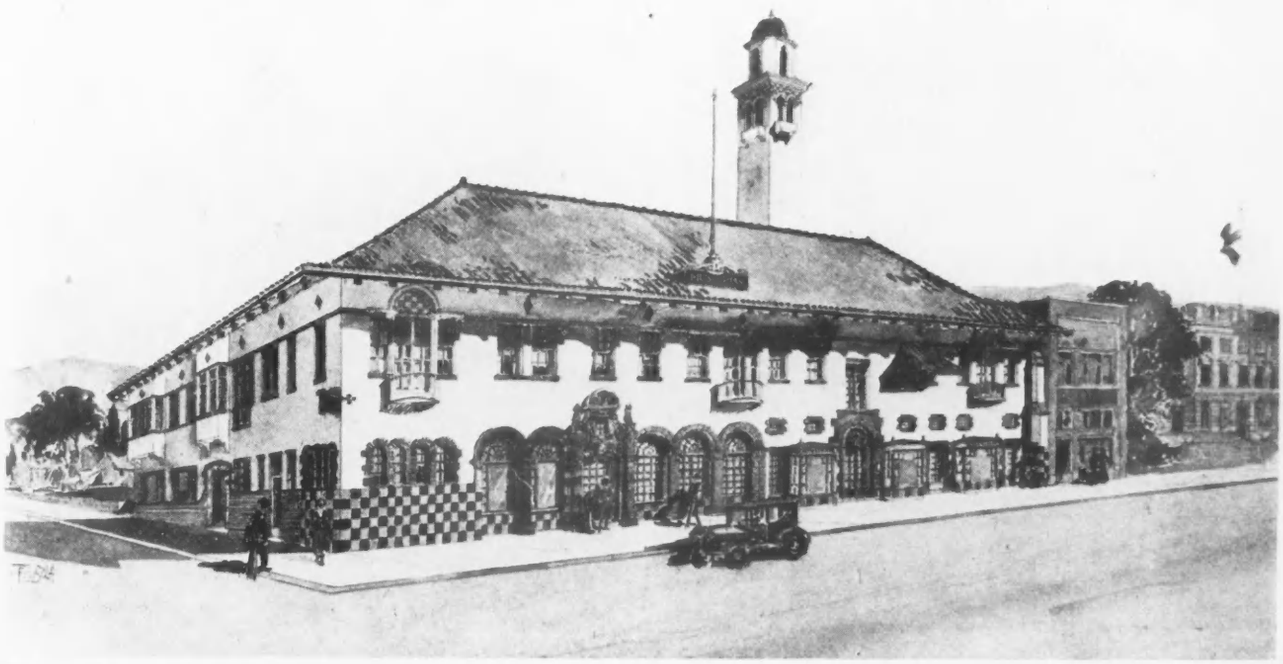
Tom P. Barnett, architect and painter of St Louis, was



Floor Plan of "Missourian" Building

Numbers on Floor Plan Explained Below.

1. Business Office.
2. Publishers' Office.
3. Library.
4. News Room.
5. Newspaper Mechanical Department.
6. Stereotyping Department.
7. Mailing Room.
8. Press Room.
9. Job Printing Department.
10. Retail Store.
11. Stock Room.
12. Entrance to Second Floor Offices.



The Spanish Tower of the Cape Girardeau Missourian Building Is the Crowning Achievement of Architect Thomas P. Barnett. It is more than 75 feet high and has a practical, as well as a decorative, purpose, functioning as a chimney for the power house.

chosen to design the new building. After the design and arrangement were decided upon, Mr. Barnett made a trip to Spain to study some of the notable examples of Spanish architecture in order that he might incorporate typically Spanish characteristics in this building.

The exterior is designed in the Spanish Renaissance style and is constructed of stucco over heavy brick walls, and is embellished by the introduction of Spanish and Tunisian glazed tile, ornamental terra cotta, brick and wrought iron.

The building has a frontage of 175.5 feet and is 113 feet deep. It is two stories in height. The lower story and basement are given over to the printing business, and to two store rooms, one of which is now occupied by a gift shop.

The upper story is divided between a comfortable and beautiful apartment home for the Naeter Brothers, and six suites of business offices de luxe.

The center of the building, rear, is only one story high, the second story apartment and the second story offices rising above it on either side in the fashion of the interior court so favored in Spain. This patio is the location of the linotype and job printing machinery, and is covered with a saw-tooth roof of concrete, flooding the machines with indirect lighting from the north, and furnishing adequate ventilation for the workmen. The main part of the building is surmounted with a Spanish tile roof with overhanging eaves. The tiles are colored in five shades—gray, green, fireflash, tan and red.



An Artistically Finished Business Office in the Upper Story of the "Missourian" Building.

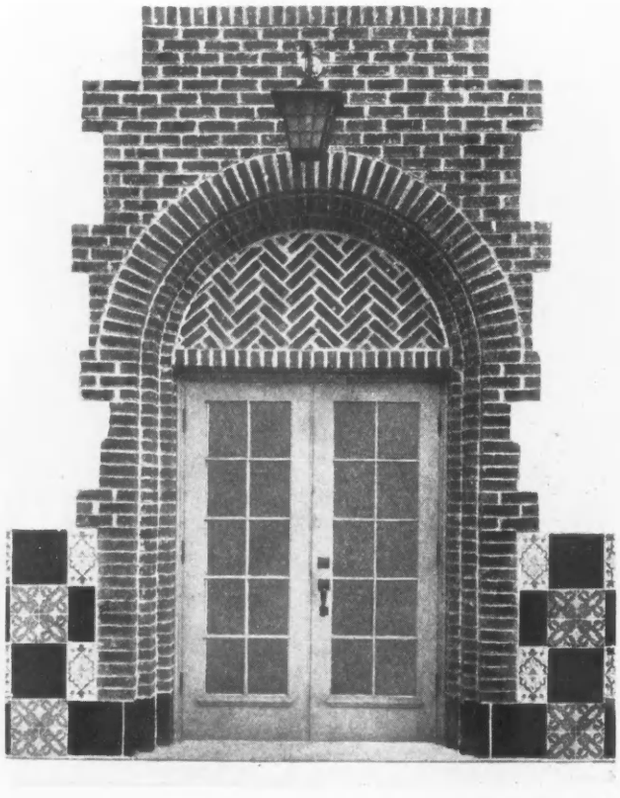
Glazed Moravian tile ornamented in conventional designs of many harmoniously blending colors is employed as a base course ranging from 18 inches to 6 feet in height. This base course serves as a protection against defacement of the building in addition to furnishing a very attractive note of color.

Upon the doorways the architect placed special emphasis. Chocolate brown terra cotta is employed, in contrast to the white stucco, in the enrichment of the main office entrance and loggia. This entrance is a beautifully sculptured piece of Spanish Renaissance design. It was designed in full size drawings by Mr. Barnett. An artistic touch of Spanish heraldry is supplied in stained glass over the keystone. The torches on either door post, bolstered by the conventional acanthus, reflect the enlightening influence of the press.

The door leading to the apartment of the publishers is bordered with Moravian tile inset in narrow stucco, with vari-



One of the Ornate Entrances to the "Missourian" Building. The picture shows the detail of the Moravian tile.



The Entrance to the Upper Story Executive Offices of the "Missourian" Building Suggests Stability and a Business Atmosphere.

colored mat brick making the rugged frame, giving an effective setting for the massive colonial door with its art glass "look out." The overhanging Spanish lantern of wrought iron completes the setting.

The simple, sturdy nature of the door leading to the business offices suggests the stability of the business enterprises upon which it opens.

The quaint windows of the two shops are an interesting departure from the ordinary show windows. They are constructed of copper, wood and Moravian tile.

One of the greatest charms of the building is the employment of the Spanish wrought iron in the projecting balconies, the hanging lanterns, and in the sign at the corner of the building.

The soffits of the overhanging eaves of the tile roof have been decorated in parti colors, following out the Spanish tradition. They are done in blue, pale yellow and vermillion, and in complimentary notes of color to the glazed tile and terra cotta used in the enrichment of the facades.

From an artistic standpoint, the most outstanding feature of the building is the skillful harmonizing of color which reflects the talent of the painter as well as the architect. The dominant color is blue of many shades, contrasting with the glistening white stucco from the base course to the underside of the roof.



The Simplicity and Quiet Elegance of This Office Are Seldom Equaled in Establishments of This Sort.

The sign of the Missourian placed on the tile roof is sculptured in terra cotta and supports the flagstaff, which is in harmony with the whole design. In the decoration of this feature a pure Spanish design has been used in connection with ornamental scrolls and garlands.



This Main Entrance to the Business Office Typifies the Artistic and Enlightening as Well as the Practical Side of the Publishing Business.

The projecting bay windows fulfill the Spanish tradition and are reminiscent of the early history of Cape Girardeau and particularly of the location this building occupies.

The interior harmonizes with the outside of the building in general effect. The ceilings, beamed with the reinforcement used in the concrete for the floor above, are left rough and have been painted chocolate brown. The walls of the business offices of the printing company are paneled in walnut. The lobbies are terrazzo floored. The Spanish windows, doors and ceiling add a touch of refinement that is unusual in business offices. The private office of the publishers is lighted with casement windows opening inward, bringing when open a touch of the blues used in the outside trim against the dark walnut panels of the inside walls. Fine shades of a light tint are used throughout the building.

The business executive offices of the second floor are still more elaborate. They are executed in walnut and paneled from floor to ceiling. The cabinet work is old English style, and the fireplaces constructed of Breche Opal imported Italian marble. The floors of the reception rooms are done in Italian marble mosaic after the [illegible] of the old cathedrals throughout Italy.

The architect has transformed the usual commonplace chamney into a thing of beauty, making of it a Spanish tower more than 75 feet [illegible] which lends the final touch of grace and picturesque[illegible]y to the building.

The building was erected by the Gerhardt Construction Company, Cape Girardeau, Missouri, at a cost of $200,000.

BELMONT FARLEY.

✣

Work Started on Davis Shores

A CONTRACT calling for building and physical development of Davis Shores, St. Augustine, Florida, totalling in excess of $8,000,000, has been let by the D. P. Davis Properties, builders of Davis Island at Tampa, Florida, to the Foundation Company, of New York and Atlanta. The contract includes a major portion of the $5,000,000 in buildings planned for 1926 and of this amount $500,000 in construction is already under way.

Steinway Hall Is Awarded Prize by Fifth Avenue Association

AN event of more than ordinary interest in building circles in New York City is the annual award of the Fifth Avenue Association, giving two prizes for the two best new buildings erected during the year in the Fifth Avenue district, and two prizes for the best altered buildings. Architectural excellence along with the improvement to the district represented by the buildings is the basis of judgment, which is rendered by a committee of lay members and architects appointed by the association and the New York chapter of the American Institute of Architects.

Architects on the committee this year were Harry C. Ingalls, Jerome R. Allen, and Joseph H. Freedlander. Lay members were Douglas L. Elliman, chairman; John Sloane, and C. Stanley Mitchell.

To owners of buildings winning first prizes went gold medals and diplomas; to owners of those winning seconds, went silver medals and diplomas. Architects responsible for designs were given certificates.

The first prize this year in the new building class was awarded to the new Steinway Hall, 109 West 57th Street, owned by Steinway & Company; architects, Warren and Wetmore. This building is deemed an imposing addition to the music and art center into which the 57th Street neighborhood has developed. Simple, classic lines are observed in this building, and were chosen, according to the architects, to express the tradition of Steinway. The architectural problem, it is stated, was to indicate on the lower floors of the facade, in a dignified manner, the home of Steinway Hall, and at the same time to provide a modern and practical studio and office building above.



The Fifth Avenue Association's Second Prize for New Buildings Was Awarded to the Macmillan Building. The Macmillan Company, owner; Carerre and Hastings, architects.

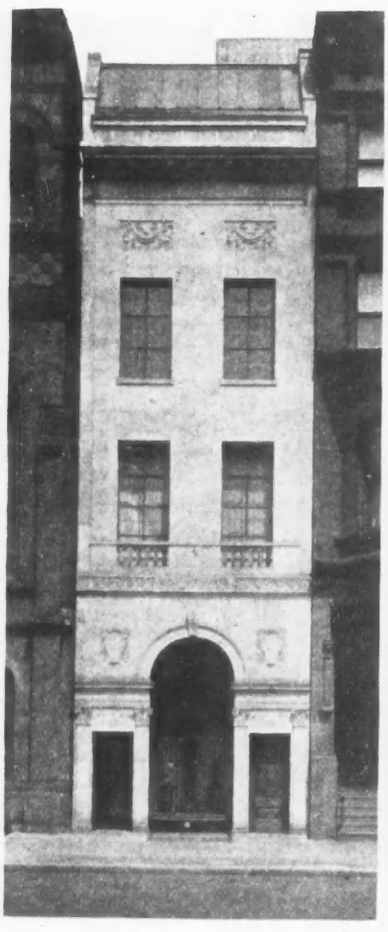
An unusual effect in the exterior was accomplished by placing the music salon, from which all windows are omitted, across the entire facade at the second floor. A feature of this exterior wall is the lunette by Leo Lentelli, picturing Apollo and the Muse.

Second prize for new buildings went to the Macmillan Building, 60 Fifth Avenue, Carrere and Hastings, architects. The building presents a dignified exterior finished in Indiana limestone. This appearance harmonizes with the traditions of lower Fifth Avenue, and with the residential aspect of the Washington Square area.

First prize among altered buildings was won by the Brummer Building, 27 East 57th Street; owner, Joseph Brummer; architect, I. N. Phelps Stokes. A problem to be met in this building was the effective use of an extremely narrow lot, 18 feet wide.

E. Gerli & Company, Inc., were awarded second prize in the class of altered buildings for the Gerli Building, 49 East 34th Street, designed for executive offices. Arthur J. Barzagli was the architect.

UNIVERSAL T. P. S.



Winner of the First Prize for Altered Buildings, Joseph Brummer, Owner, and I. N. Phelps Stoker, Architect.



Second Prize for Altered Buildings Went to E. Gerli & Co., Owner, and Arthur J. Barzagli, Architect.



In the Annual Architectural Award of the Fifth Avenue Association, Inc., New York City, the First Prize for New Buildings Was Awarded This Year to the New Steinway Hall, 109 West 57th Street. To the owner of the building, Steinway & Co., went a gold medal and diploma, while the architects, Warren and Wetmore, received a certificate.

Eight Notable Perspectives in Color This Month

Including Splendid Group of Buildings Designed for the New McKinlock Campus of Northwestern University

By BERNARD L. JOHNSON
Editor, American Builder

WE are fortunate in being able to present in this, our big annual reference issue, twice the usual number of architectural renderings of notable architecture in duotone.

Where so many leading architects are represented, it is difficult, indeed, to make any selection for comment. From the standpoint of national interest, however, the group of buildings for the new Northwestern University campus in Chicago is particularly noteworthy. President Scott, whose portrait is illustrated along with this group, is the executive at the head of one of the great American universities, whose alumni are scattered all over the continent and some holding posts of honor abroad.

This great educational building enterprise has been made possible by the generosity of a distinguished group of wealthy men and women, who are figures of national prominence. The description a little farther down on this page will, therefore, have particular interest for AMERICAN BUILDER readers.

New Masonic Temple, St. Louis, Mo.

Eames and Young, Architects

This remarkably fine masonic headquarters building follows the lines of a stately Greek temple in its Ionic architecture, which, however, is given a modern touch with a set-back feature. While the building is nominally only five stories in height, it is actually the equal of a twelve-story office building. It contains a complete theater with seating capacity for 2,200, an auditorium 160 feet by 75 feet for the Knights Templar Commandery, 11 lodge rooms, three for the Eastern Star chapters, 25 offices with separate entrances for each chapter, and a kitchen and dining room in the basement with a seating capacity for 2,500 people.

The building is to be equipped with six elevators and the most modern heating, ventilation and lighting, as well as handsome finish and decoration. The estimated cost, including a site 285 feet long by 175 feet wide, is $4,000,000.00.

Northwestern University Buildings for the New McKinlock Memorial Campus

James Gamble Rogers and Childs and Smith, Associate Architects

This is to be an imposing and beautiful group of five buildings on the new McKinlock Memorial Campus, almost in the heart of downtown Chicago, located on East Chicago Avenue fronting Lake Shore Drive. It is to be the professional schools' campus of Northwestern University. The project has been made possible by the generosity of a nationally known group of wealthy men and women.

The Elbert H. Gary Library Building will be an attractive building, three stories high, of modified Gothic architecture and built of Indiana limestone. The other buildings are of harmonizing architecture. The view shown in the architects' perspective is from Lake Shore Drive looking west. The building at the right is the Levy Mayer Hall of Law, with the roof of the Gary Library Building showing above it. To the left is the Thorne Auditorium, with Wieboldt Hall showing above and behind it, while the building whose tower shows in the background is the Montgomery Ward Medical-Dental Center. Work is now in progress on these buildings and will be completed, it is hoped, some time during the coming year.

The total cost of this project will be about $5,000,000.00.

These departments of the university have, for a number of years, been housed in an old building situated on Lake Street, on the edge of Chicago's Loop, where they now have one of the most complete law libraries—if not, the most complete—in the United States.

Church of the Blessed Sacrament Seattle, Washington

Beezer Brothers, Architects

This structure is considered one of the finest examples of pure Gothic architecture in the United States. Its symmetry, strength and simplicity are essentially Gothic and the balance of its proportions shows fine architectural sense.

The cross on the 205-foot tower is about 160 feet above the surrounding roofs on Fifty-second Street in Seattle's university district, which illustrates its truly monumental appearance.

The plan of the church is cruciform, or Latin cross in shape. The total length of the church is 186 feet and the width at the transepts 104 feet. The main body of the church will seat 1,125 and the choir gallery about 90 persons.

The entire exterior of the building is of face brick and finely wrought art stone. The roof is of genuine black Pennsylvania slate. The metal parts and covering of the spire are of cold rolled sheet copper. The interior walls will, later, be veneered with Caen stone on all columns, arches, doors, window jambs, etc., and plain wall surfaces will be finished with porous acoustic blocks, giving the effect of finely cut stone. The ceiling shown in sketch illustrated on page 235 is of native cedar wood. Although erected several years ago, much of the interior finish is yet to be installed.

New Hospital for Joint Diseases, New York, City

Buckman and Kahn, Architects
G. Richards Davis, Builder

This splendid new hospital building is said to be the greatest orthopedic hospital in the United States. From its small beginning in a remodeled residence to its present success, it has been made possible through the untiring devotion of its founder and surgeon in chief, Henry W. Frauenthal, M. D.

In accordance with the founder's idea that the hospital should resemble a sick man's hotel in its appointments, the main entrance bears a striking resemblance to a hotel. The visitor faces a desk, or series of desks, where information is obtainable regarding patients. Here are located the cashier, bookkeeper, information clerk and telephone operator. On either side of the entrance are the reception rooms. A safety deposit vault is included in the office equipment, so that every patient, if desired, may here deposit his valuable papers.

A special department is provided for the reception of

(Continued to page 235.)

ART SUPPLEMENT *of* NOTABLE ARCHITECTURE



PLATE 77

The NEW MASONIC TEMPLE, St. Louis, Mo.; Eames and Young, of St. Louis, Architects. Classic Ionic architecture, a large auditorium and many Chapter rooms and offices make this building notable.



WALTER DILL SCOTT
President, Northwestern University

NORTHWESTERN UNIVERSITY, Chicago; new buildings for the Alexander McKinlock Memorial Campus; James Gamble Rogers and Childs & Smith, Associate Architects. A fine example of group architecture.

PLATE 78

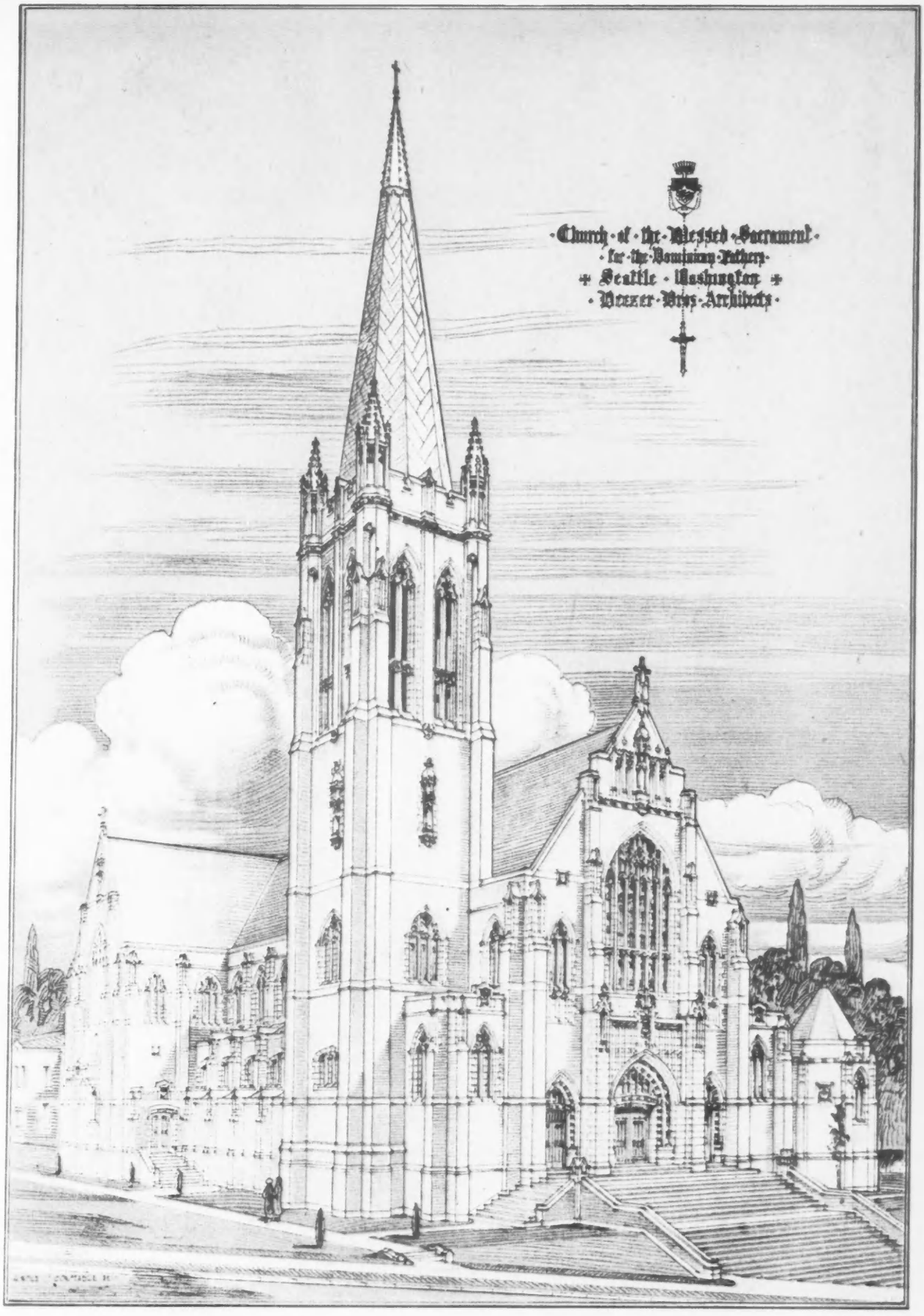


PLATE 79

Church of the Blessed Sacrament, Seattle, Wash.; Beezer Brothers, Seattle, Architects. A beautiful example of church architecture.

Memorial Campus; James Gamble Rogers and Childs & Smith, Associate Architects.
A fine example of group architecture.



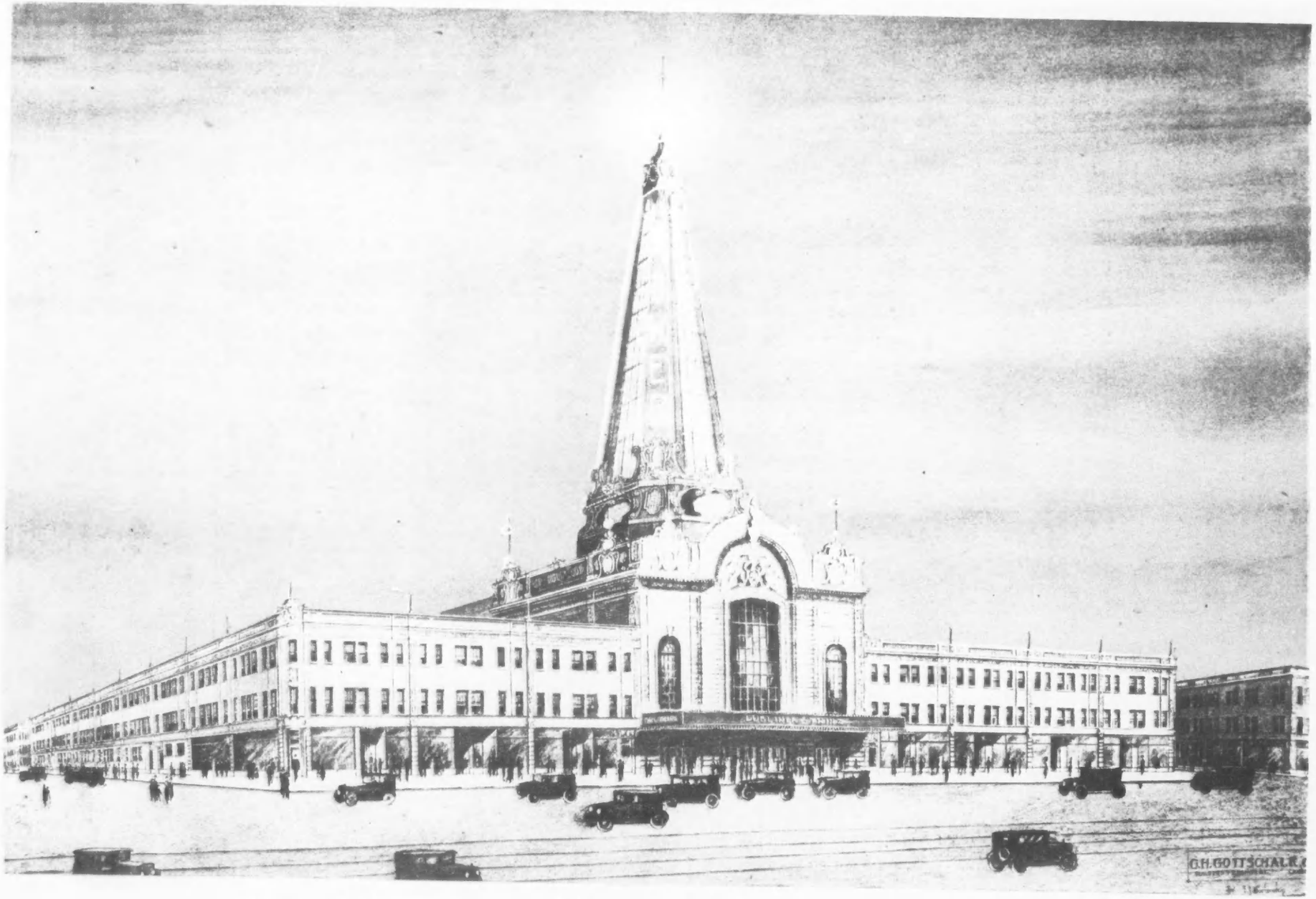
PLATE 80

New Hospital for Joint Diseases, New York City; Buchman & Kahn, Architects and Mr. Oliver Bartine, Consultant. A well designed hospital and the only one of its kind in the country.



PLATE 81

The Court and Remsen Building, Brooklyn, N. Y.; Schwartz & Gross, New York, Architects. This will be the highest building in Brooklyn.



The Tower Theater Building, Chicago, Ill.; G. H. Gottschalk Co., Engineers and Architects. A high steel tower and beacon light is one of its novel features.

PLATE 82

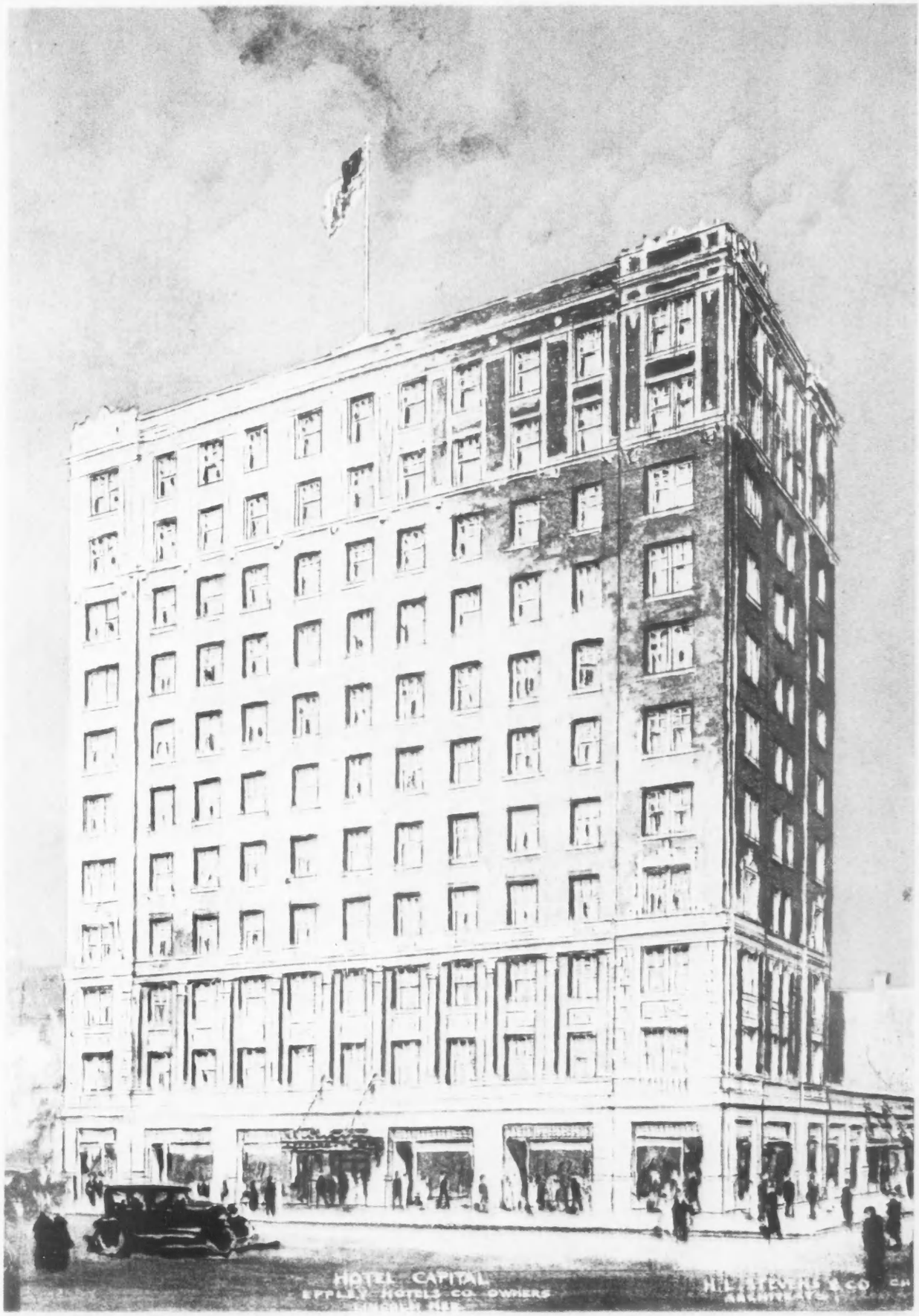


PLATE 83

The Hotel Capital, Lincoln, Neb.; H. L. Stevens & Co., Chicago, Architects.
A fine example of hotel architecture.

Architects. A high steel tower and beacon light is one of its novel features.

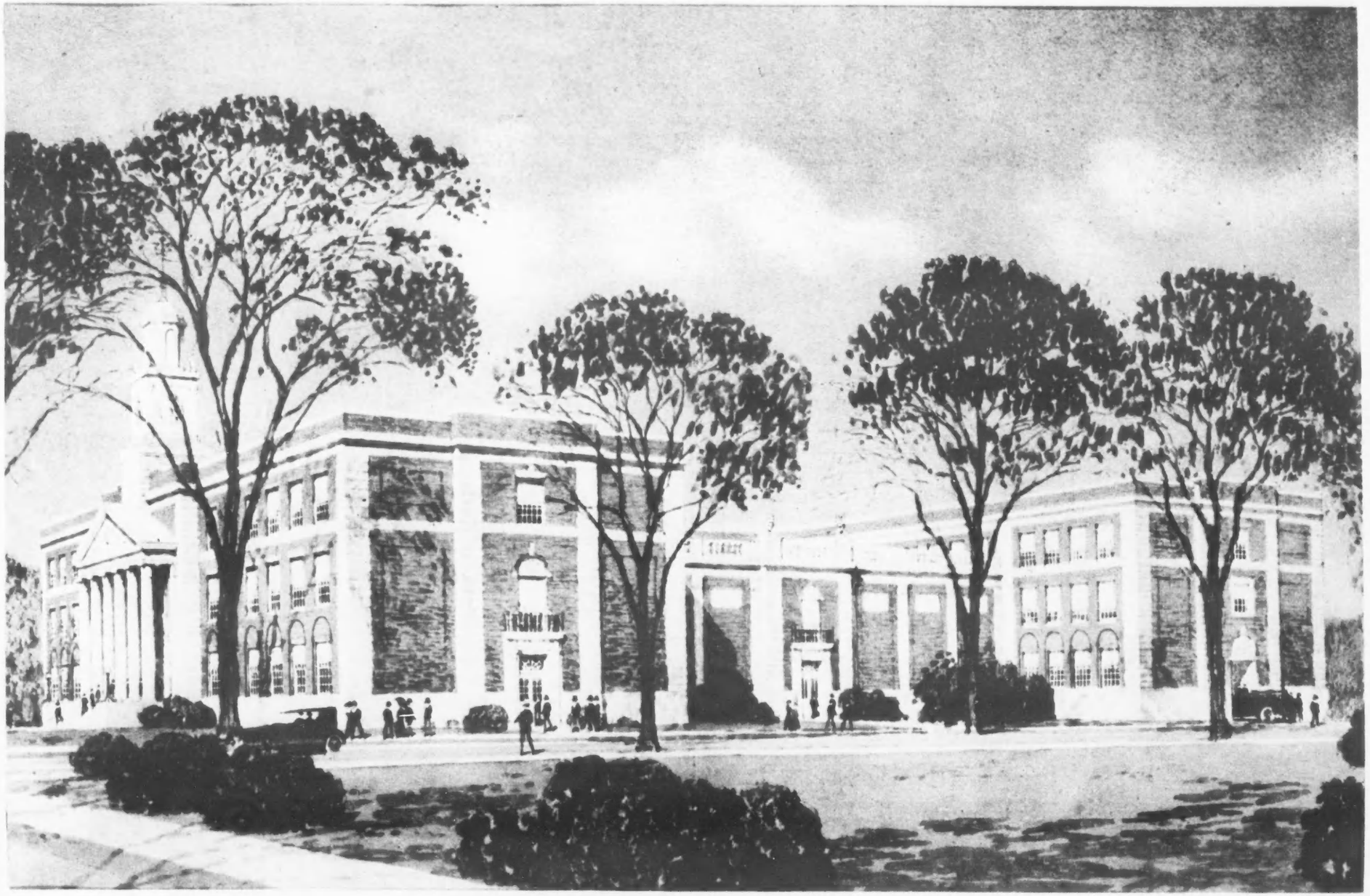


PLATE 84

High School, at Rutland, Vermont; Tocker & Marsh, New York City, Architects.
The lines of this fine school are typically New England Colonial.

Notable Architecture Plates Described

(*Continued from page 226.*)

ward patients, with rooms for the examining physician, who is always in attendance.

Each ward has its own balcony large enough to accommodate all the beds of a single ward. The patients are wheeled out in their beds onto these balconies and exposed to the sunlight and fresh air. On the roof, overlooking Mount Morris Park, is a large solarium.

The seventh floor of the new hospital is the most unique of all, for it is not a hospital at all, but a school. Many of the children have to remain several months in the institution because they require daily care. Teachers and class rooms make it possible for them to continue their studies, so that they are not behind other children of their age when discharged from the hospital. Included in the school facilities is a kindergarten department, a manual training room and a sewing room. Doctor Oliver H. Bartine is the hospital consultant, responsible for many of the ideas incorporated in the design of the hospital.

Court and Remsen Building, Brooklyn, N. Y.

Schwartz and Gross, Architects
Dricken Construction and Imp. Corp'n, Builders

The tallest building in Brooklyn, N. Y., now in process of construction, will be the Court and Remsen Building, at 26 Court Street, facing Borough Hall Park. It will rise to a height of twenty-eight stories, with base dimensions of 100 feet by 137 feet six inches. There will be setbacks of three stories each at the eighteenth, twenty-first and twenty-fifth stories. It will have a facade of limestone and brick to the fourth story.

The main entrance is in the center of the Court Street front, and will have an imposing doorway and corridor. Just inside the corridor starts an extremely wide marble stairway, leading to what is planned as a banking floor. This floor has wide arched windows, high ceilings and finish on an appropriately grand scale.

From the third to the twenty-eighth floors are offices varying in size from a few hundred to several thousand square feet, all of them well lighted and capable of subdivision. A few entire floors are to be kept as single office units, offering approximately 9,000 net square feet each. The ground floor is planned for stores. Nine high-speed elevators will provide service.

Tower Theater and Business Block, Chicago, Ill.

G. H. Gottschalk Company, Engineers and Architects

As the perspective shows, this is a most unusual and interesting building, surmounted by an open steel tower, 139 feet high, very ornately designed and illuminated at night. The central feature of the building is a large theater seating 3,200 persons, 2,400 on the main floor and 800 in a loge mezzanine. An unusual effect of immensity is given by the theater lobby, 72 feet square, with a vaulted dome ceiling 70 feet high. The design of this lobby makes it one of the most unusual and striking entrances of any theater in Chicago.

The building will also contain 16 stories and 110 small apartment suites, each of these suites having living room, dining room, kitchenette, bed closet and The exterior of the building is designed in the Louis XVI style of architecture. The property occupies an entire block on Sixty-third Street, between Harper and Blackstone Avenues.

The Hotel Capital, Lincoln, Neb.

H. L. Stevens and Company, Chicago, Architects

This new 11-story hotel for Lincoln, Neb., has been designed for the Eppley Hotels Company, owners. It is a fine example of hotel architecture and is a modern, fireproof structure, with the latest hotel comforts and conveniences. The design is featured by a free use of terra cotta ornamentation at the three lower and two upper floor levels.

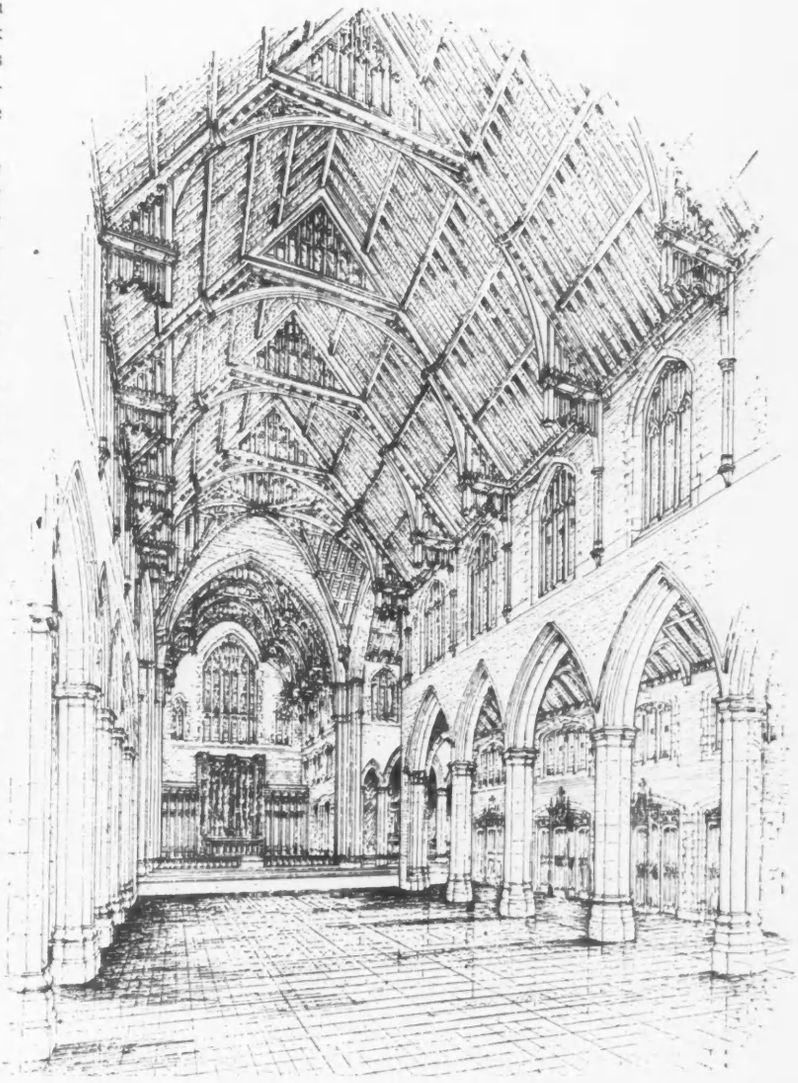
High School at Rutland, Vermont

Tooker and Marsh, New York City, Architects

Perhaps no architects in the United States have been more successful with Colonial school designs than have Tooker and Marsh, New York. The new Rutland High School shown in this month's perspective has many interesting features.

The plans provide for a building so planned that it can be built in two units. The second unit will contain the auditorium, gymnasium, laboratories, vocational rooms, administration quarters, offices, teachers' rest rooms and other similar rooms that can be temporarily omitted.

The building will be of fireproof construction with red Colonial brick exterior facing and stone trim.



Sketch Showing Interior of the Church of the Blessed Sacrament, Seattle, Washington, the Exterior of Which Is So Beautifully Illustrated in Duotone Tints on Plate 79 of the Duotone Section Just Preceding.

The lines of this fine school are typically New England Colonial.

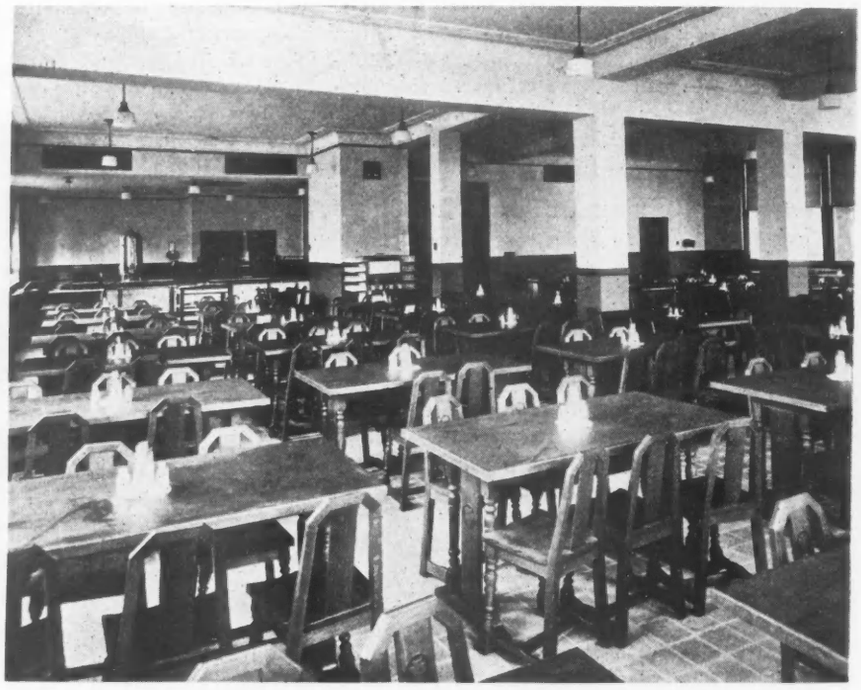
Remarkable Progress Made in Educational Equipment

American School Students Now Have Modern Facilities for Technical, Business, Domestic and Athletic Training

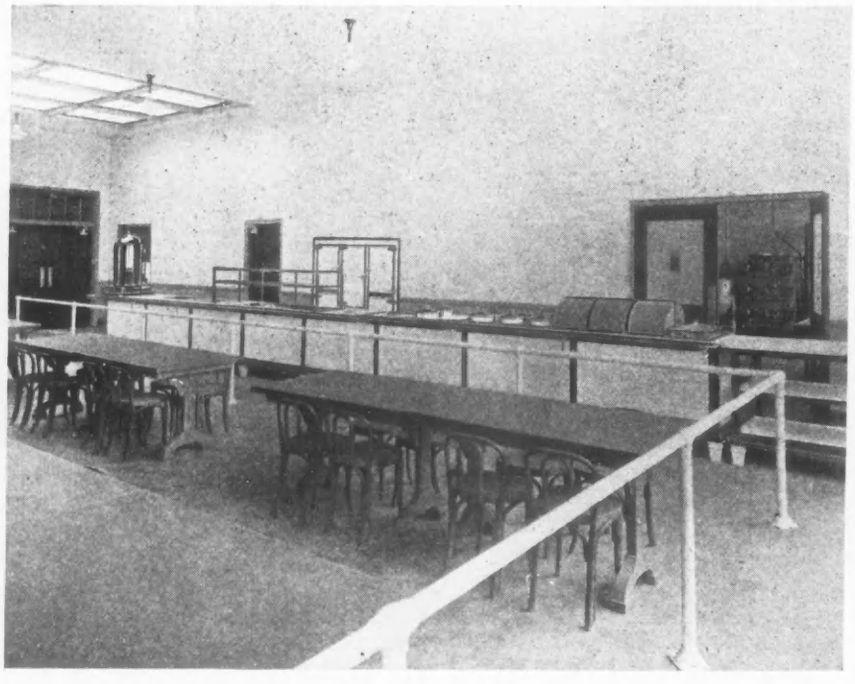
IT is but a short span of years since books and benches formed the main equipment of our public schools. Housing there had to be but it was made as primitive as possible—merely a shell of a building with a stove for heating. The evolution of the modern school has been so extensive that school buildings, today, far surpass many other types of buildings in the great variety of equipment required.

Heating and ventilation have been carried to their ultimate development and are as nearly perfect as human ingenuity can make them. The "split" system is becoming almost universal. This means washed, warmed and humidified air blown into the class rooms by fan pressure but not hot enough to take care of all heat losses in cold weather. This added heating requirement is taken care of by direct radiation placed along the walls and supplied from large steam boilers. This requires a considerable power plant and it is often found economical to install electrical machinery and generate electric light and power, if the school is a large one. The exhaust steam is then economically used for heating.

A high school building, today, requires many of the features of a first class club, hotel or commercial building. Very few students bring lunch packages because the modern school cafeteria supplies them with a wholesome variety of freshly cooked food at a very moderate cost. The cooking and serving departments of these cafeterias are fully equal—in most cases—to the best equipped commercial cafeterias. The school designer lays out the kitchen, serving and stock rooms with the same principles of efficiency in view as for a hotel. Kitchens must have large coal, gas or electric ranges; steam vegetable cookers are required, also pastry ovens and power driven mixers and beaters. Even the potatoes are peeled by power and the dishes washed by automatic dish washers. Steam tables are quite an important feature of these cafeterias, as the viands must be kept hot for a considerable length of time. In many school cafeterias, an excellent luncheon can be obtained for about twenty-five cents but, of course, each item on the menu is separately priced.



Cafeteria in the Flint High School, Flint, Michigan. All facilities are provided which are found in the best commercial cafeterias.

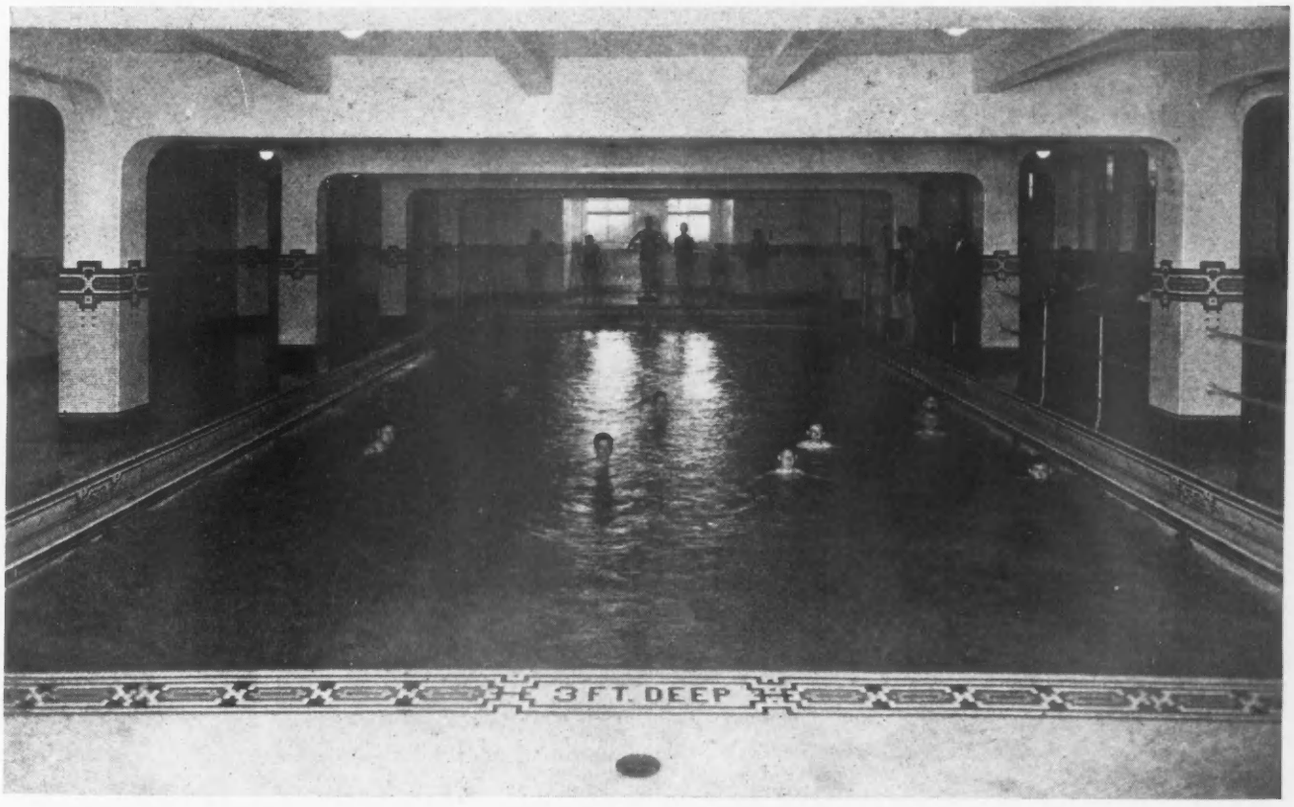


View of Steam Serving Tables in the Saginaw, Michigan, High School. The students bring their trays to these tables for service, just as in other cafeterias.

A very important feature of school buildings—as affecting the health, eyesight and comfort of the children—are the window sash. Steel ventilating sash of several different types are popular with school designers and one of the most approved types is shown in the large halftone illustration of St. Augustine's Academy, Cleveland. This



A Class in Architectural Drafting at the Boys' Technical High School, Milwaukee, Wisconsin. Many of these boys will become useful members of the great building fraternity.



This Swimming Pool at the Boys' Technical High School, Milwaukee, Wisconsin, Is Equal in Many Respects to Those in the Best Athletic Clubs.



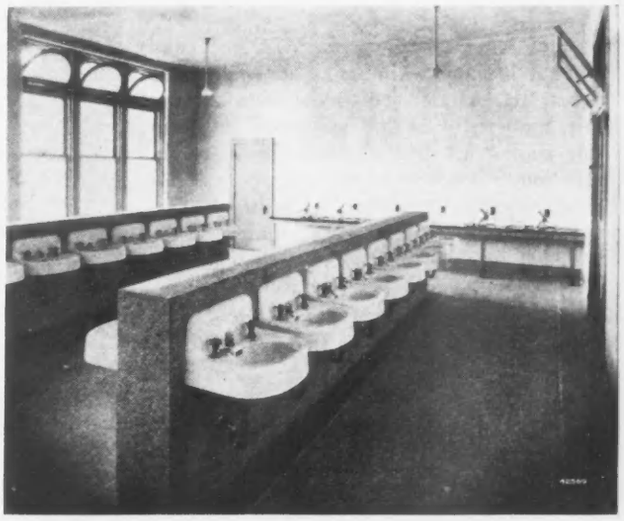
This Shows the Plumbing Class of the Boys' Technical High School, Milwaukee, Wisconsin, and Its Splendidly Equipped Class Room. Note the mezzanine floor, or gallery, wth bath tubs, lavatories, sinks and other pieces ready for piping, as well as the individual piping exhibits and work tables on the ground floor. Here, the boys get both theoretical and practical training and are better posted than the average plumbing apprentice.

picture clearly reveals the splendid light and air supplied the children in this classroom. It is as if they were in the pure air of outdoors but direct drafts are avoidable, if desired.

Fine interior finish and decoration are features of many modern school buildings. Particularly impressive and beautiful effects are gained by the use of glazed tile, faience or marble of different tints. We present interior views showing marble used as interior finish in high schools at Philadelphia, Boston and Salt Lake City. There is a great advantage in selecting for school walls and floors such hard and impervious finish as can be kept bright and clean at all times and involves no expense for redecorations, renewals or repairs.

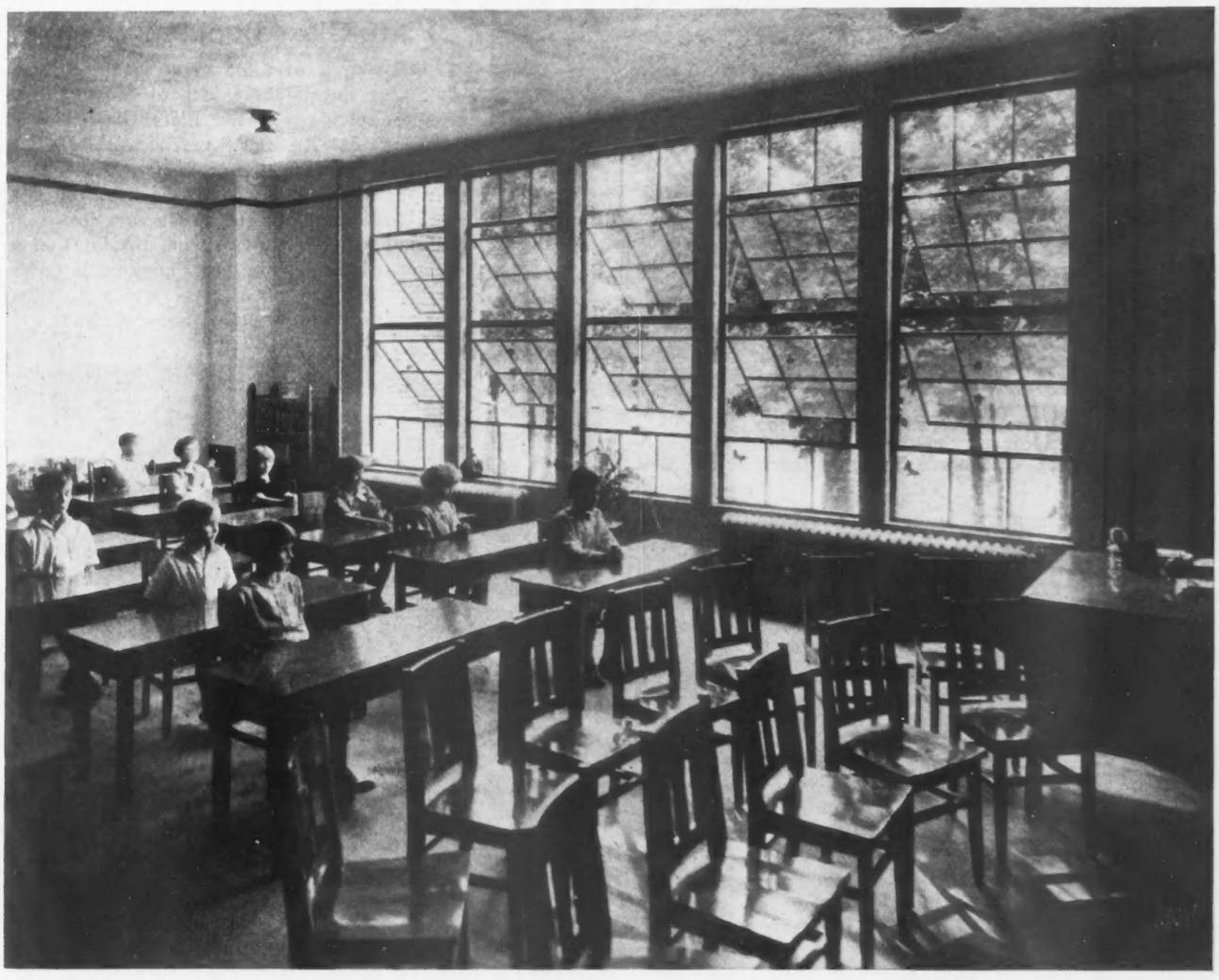
High schools require practically all the laboratory and athletic equipment to be found in colleges. The technical high schools require, in addition, considerable shop equipment. One of the best of these is the Boys' Technical High School at Milwaukee, of which we present several views. The very special equipment required is clearly illustrated in the plumbing class room and also the class room where architectural drawing is taught. There is also a woodworking department with a good many tools and machines.

Gymnasiums and swimming pools are quite usual features of new high school designs and athletic and community life seems to be centering around the high schools in many communities. The halftone illustration of the swimming pool at the Boys' Technical High School, Milwaukee, shows it to be large and well designed.



View of Wash Room at the Mt. St. Scholastica's Academy, Atchison, Kansas, Showing Ample Equipment of Lavatories.

One of the greatest school problems has been, in the past, that schools constituted centers of infection and colds, whooping cough, measles and even more serious diseases were spread through a community by means of the schools. Physicians and school authorities attributed much of this

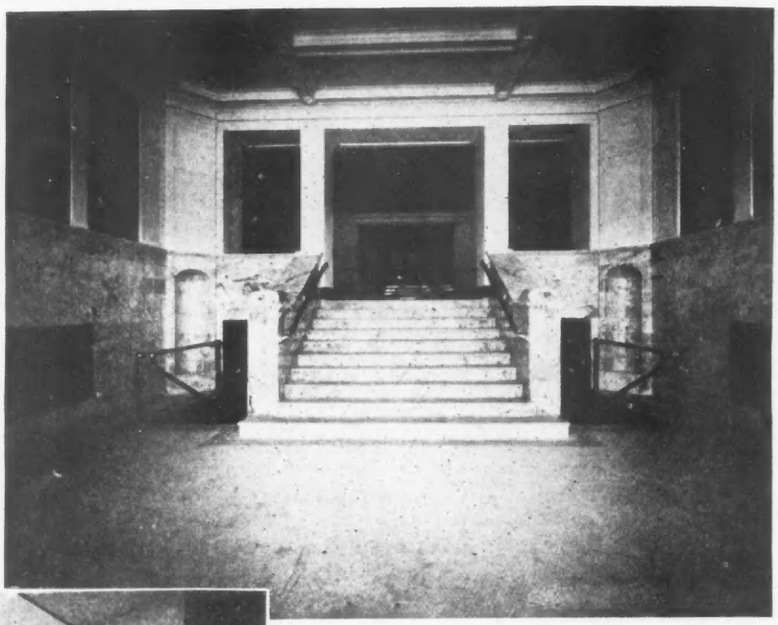


One of the Class Rooms in St. Augustine's Academy, Lakewood, Cleveland, Ohio, Showing Adequate Light and Ventilation Procurable with Steel Sash. William Koll, architect, and Schirmer and O'Hara Company, Cleveland, builders.

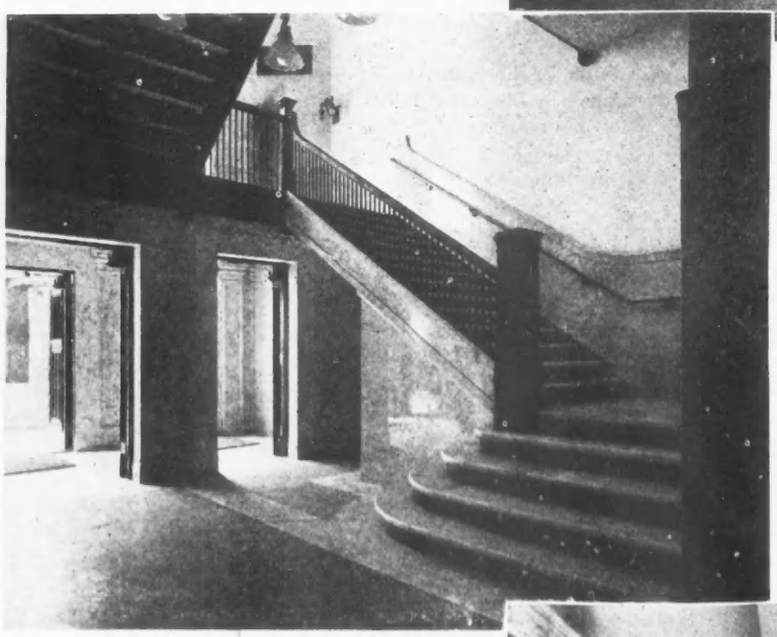
to dark, insanitary toilet rooms and dirty basements. This is one reason for the elimination of basements in many modern school designs. It has also led to the installation of ample, modern toilet and washroom facilities. These rooms are given plenty of light and ventilation. The view of the washroom at Mt. St. Scholastica's Academy, Atchison, Kansas, shows the extensive lavatory equipment in that establishment and the room is shown to be light and well ventilated. Many schools are also provided with shower baths. In short, it is felt in educational circles that a school cannot be too hygienic or sanitary and these provisions are emphasized.

Fire escapes are still considered essential by many school designers, but many architects consider them a confession of weakness in the building plans. In cities like New York and Chicago their provision is compulsory. The truth is that fire in a well built, modern school —while not impossible—is extremely unlikely. Incombustible building materials are used throughout. There is still, however, the possibility of panic, and wide corridors and short, wide stairways are the rule. In fact, there is a tendency among school designers to design school buildings only one story in height wherever possible. It is obviously impossible to apply this principle of design to a large school building, such as most high schools are nowadays.

The tendency is towards larger grounds around high schools, especially where land values have not reached the metropolitan level. This is due to the universally approved tendency towards athletics in school life. Tennis courts, football fields and baseball fields, grand stands, bleachers and cinder track require considerable ground area and school sites are being selected with this requirement in view wherever possible to obtain a suitable location including sufficient ground.



Entrance to the Salt Lake City High School Is Gained Through This Fine Marble Lobby. Eldredge and Chesbro, architects.



Marble Has Been Effectively Used in the Lobby and Corridors of This West Philadelphia High School. J. Horace Cook, architect.



Effective Use of Marble Has Been Made in Corridors and Stairways of the Masten Park High School, Buffalo, New York. Essenwein and Johnson, architects.

Plate Glass Demand Grows

THE output of plate glass in the United States during 1925, according to P. A. Hughes, secretary of the Plate Glass Manufacturers of America, reached 117,224,295 square feet, beating the production of the best previous year by 25,669,821 square feet and more than doubling the production for 1921.

Builders of apartments and dwellings have recognized the heating economies made possible by the use of a glass which is thick enough to act as a virtual non-conductor.

High School of Medium Size with Latest School Design Ideas

A Plan Which Would Be Suitable for Many of the Smaller Communities

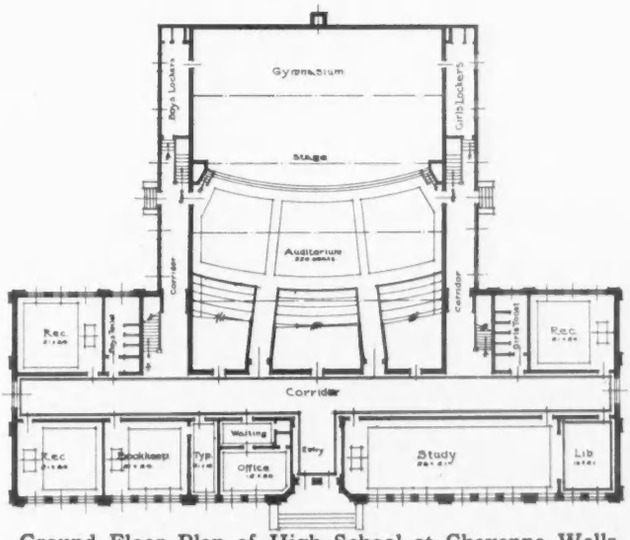
EVEN the smaller cities throughout the country demand the latest features in school design and equipment. Cheyenne Wells, Colorado, is one of the smaller cities of the country but now has this very complete school building, with all the latest features of combined heating and ventilation, gymnasium and auditorium, physical and chemical laboratories, domestic science and sewing rooms, with recitation rooms arranged for the platoon system.

It is a two-story building with fireproof corridors and stairways. The building is heated from a central boiler plant below the stage, which is fireproof. By means of fans, fresh, warmed air is blown into each of the class rooms, making a change of air six times every hour.

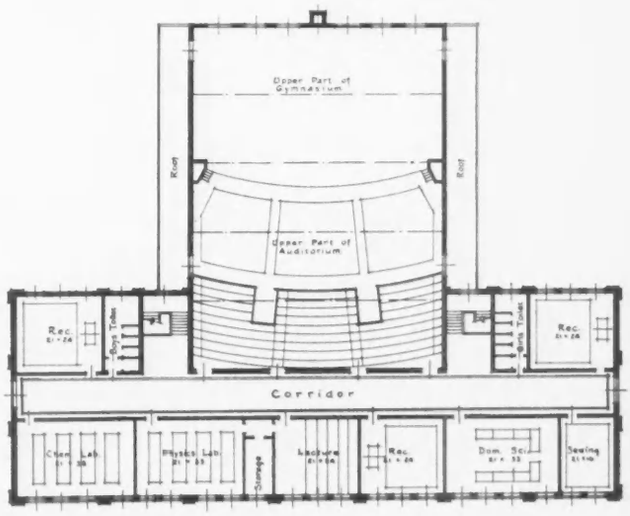
The stage is used for basketball games and the auditorium as seating space, accommodating about 600 people. The building cost was approximately $150,000.

The office and waiting room is just to the left of the main entrance fronting on the corridor which traverses the building. Just to the right of this entrance is a study room which is 56 feet by 21 feet. The chemical and physical laboratories and the domestic science and sewing rooms are on the second floor, also the balcony of the auditorium. There are six recitation rooms, three on each floor, and toilet rooms for the boys and another for the girls on each floor.

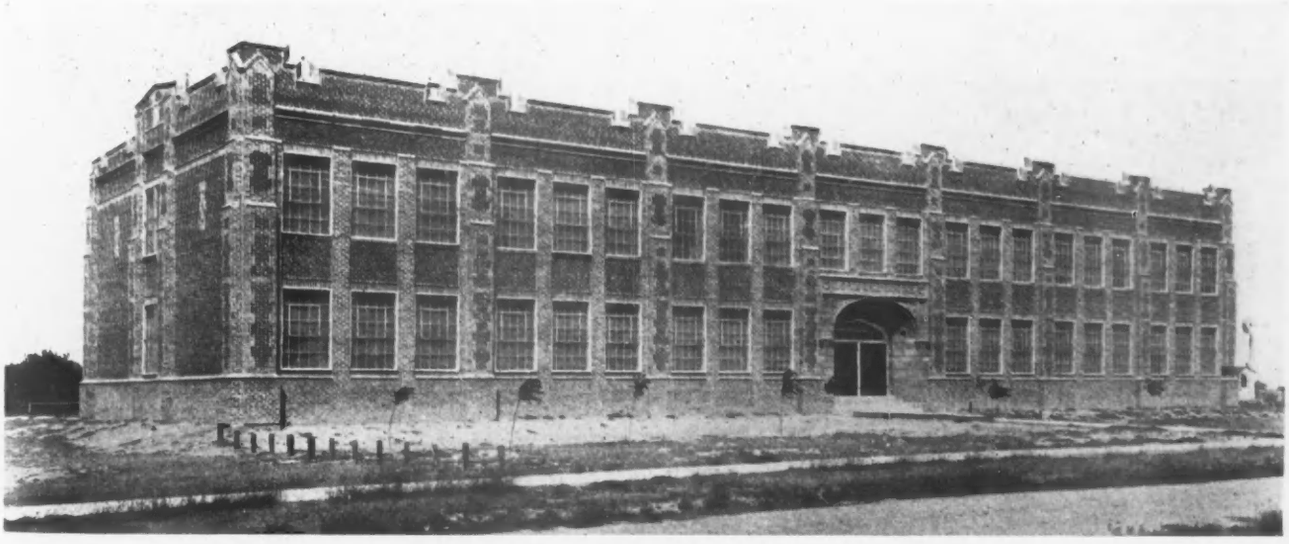
This is a well-balanced school design and one which would be appropriate in many localities.



Ground Floor Plan of High School at Cheyenne Wells, Colo. A boiler room is located beneath the fireproof gymnasium stage.



This Second Floor Plan Includes the Balcony of the Auditorium. There are three recitation rooms on each floor.



This View of the New High School at Cheyenne Wells, Colorado, Shows a Brick Exterior with Stone Trim. This school cost $150,000 to build and was designed by Mountjoy and Frewan, architects, of Denver, Colorado.

One of the Best High Schools in the Middle West

The Benjamin Bosse High School at Evansville, Indiana, Is Representative of the Latest Ideas in School Design

Joseph C. Llewellyn Company, Architects

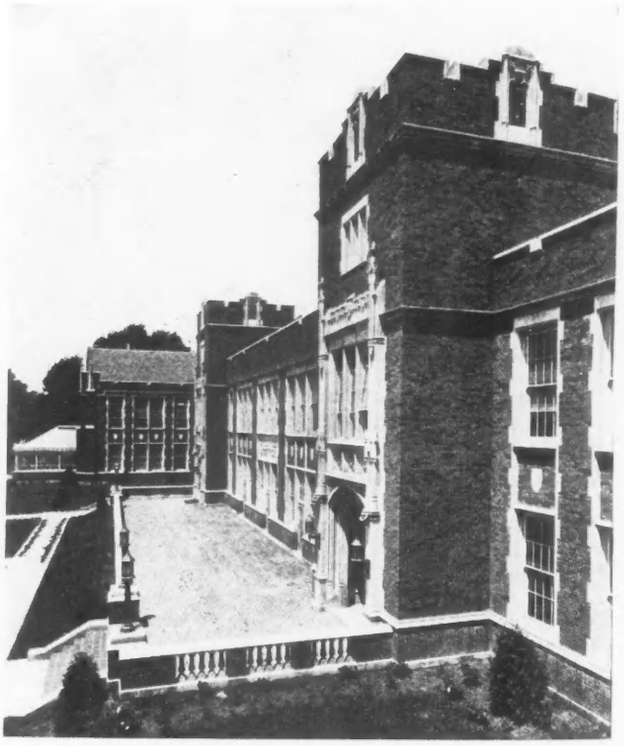
THE first thing which impresses a visitor to the Benjamin Bosse High School at Evansville, Indiana, is the similarity to a group of college buildings. For, though there is but one building, there are many wings, which, with several towers in the English style of Gothic architecture, lend to the building a group appearance. Another factor contributing to this effect is the great extent of the park-like grounds. In fact, this school was built on a 15-acre tract facing south on Washington Avenue and containing many fine old trees.

One modern feature of the site development is a large concrete parking space to the east, while, to the west, there is a fine athletic field with track, grand stand and bleachers, a football field and a baseball field, and, to the south, a beautiful sunken garden with terraced sides. Space is reserved for a modern stadium and stands to seat 4,000 people.

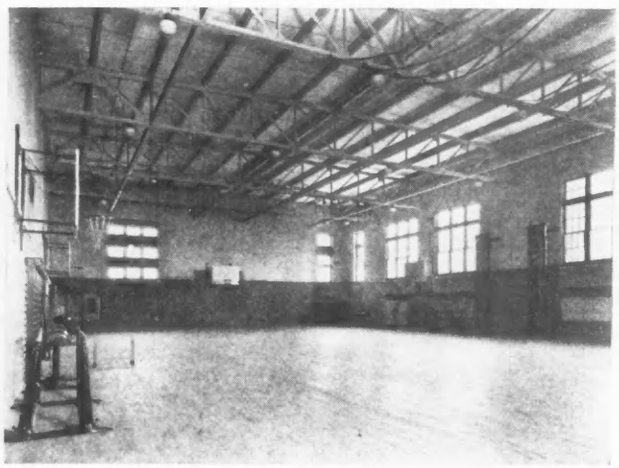
The exterior walls of this school are red face brick of rough texture and Indiana limestone has been most effectively used as trim to carry out the architectural effect. There are four arched main entrances where this effect has been stressed and also in the square towers which rise above the roof lines.

There are but two main floors to the building adhering to the modern school plan which does away with dark, insanitary basement rooms. The principal's office and a large community room seating 200 people are located in the central section of the south wing. Among our illustrations will be found a view of this community room which has a stage at one end and a fireplace at the other end. It is used, not only for parent-teachers' meetings but also for any meetings of a community nature. When this room is in use during school hours, it is effectively shut off from the school corridors by decorative iron gates on both floors.

The school library, seating 75 students, with a large library working room and a periodical room, is located on the upper floor of the central wing. Here also is located the physics unit of the lecture room and a laboratory, a large store room and a dark room. There is also provided on this floor a teachers' consultation room—a very convenient feature. Here the teachers can meet and discuss matters of school policy. There is also a rest room for men and one for women on either side, with toilets attached. The corridors in this part of the building are large enough to contain exhibit cases and works of art and there are a number of built-in cases for exhibits and trophies in these corridors.



One of the Beautiful Main Entrances to the Benjamin Bosse High School.

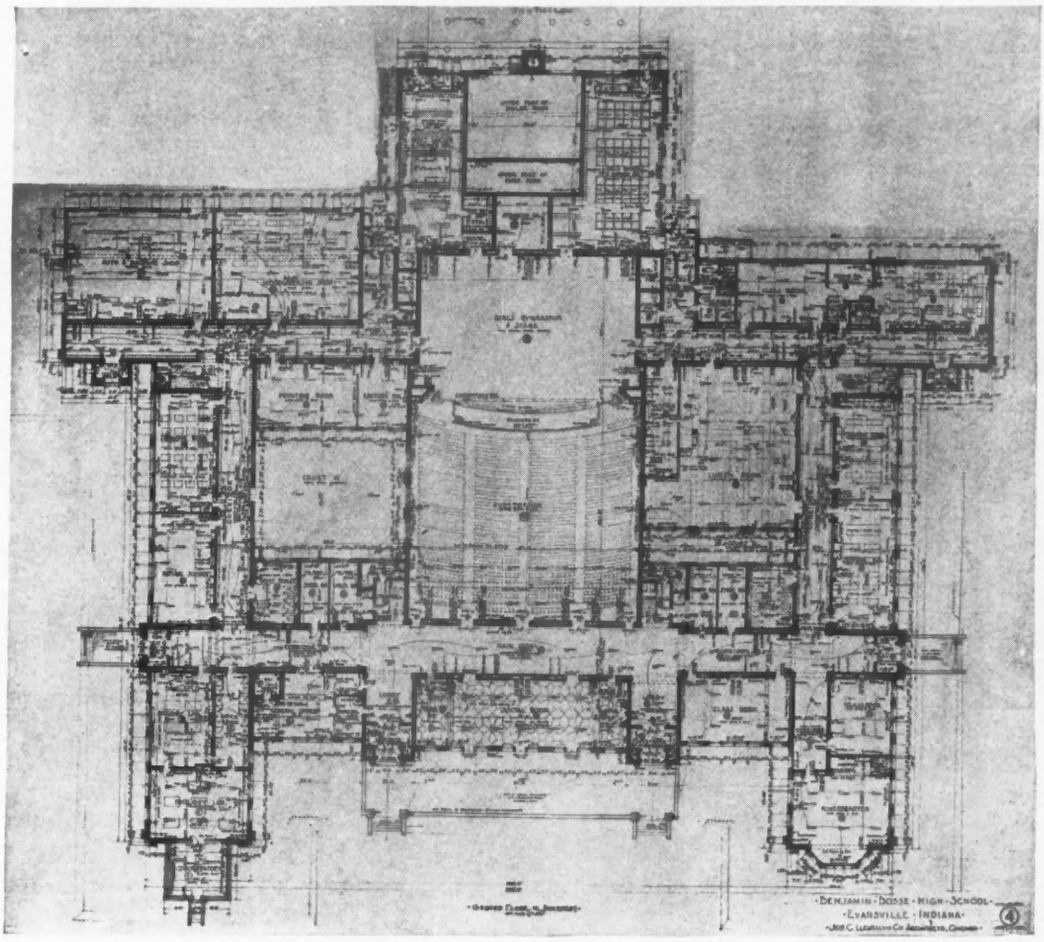


Boys' Gymnasium of the Benjamin Bosse School. There is also a stage gymnasium.

Two large biological laboratories are located in the west wing on the ground floor, together with a conservatory at the south end and a large room for the storage of specimens. There is also a mechanical drawing room, wood-working shops, auto repair shops and a general science lecture room located in this part of the building. The boys' study hall, office practice room, shorthand, bookkeeping, typewriting, music, four classrooms and the office of the boys' physical director are located on the floor above.

A temporary kindergarten room, two sewing rooms, cooking room, model dining room and three classrooms are on the ground floor of the east wing. There is a large study hall, chemistry unit of lecture room, dark room, large store room with built-in cupboards, laboratory and eight class rooms on the upper floor of this wing.

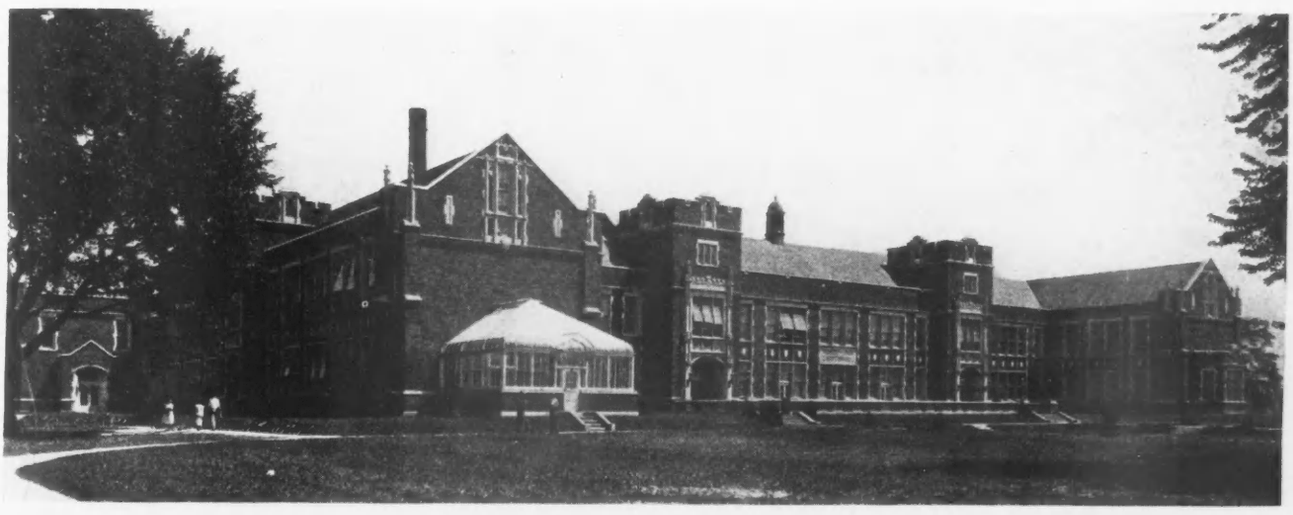
A recognized feature of high schools nowadays is the auditorium and the Bosse High School auditorium is spacious, well lighted and complete, seating 1,450. It is located



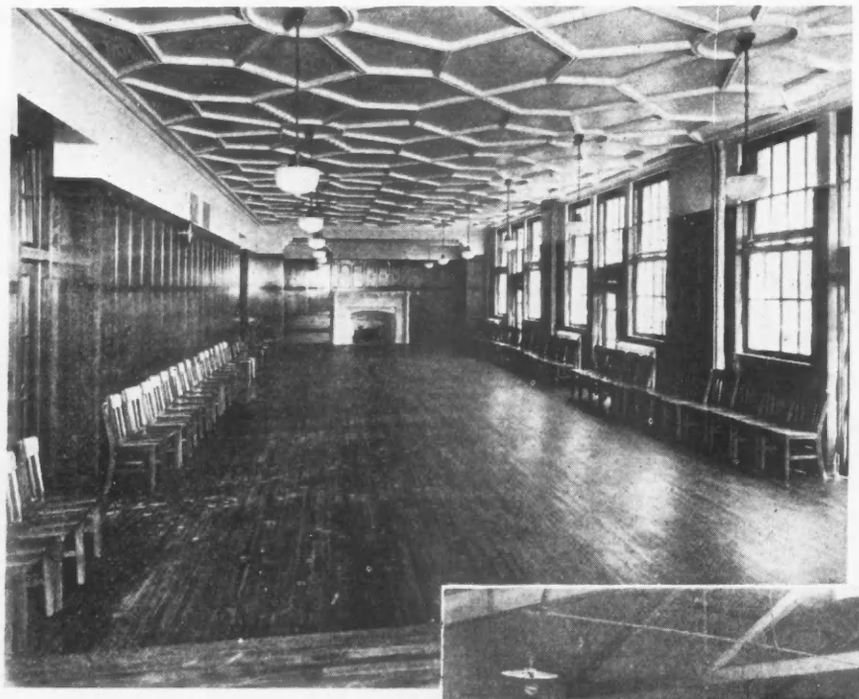
Ground Floor Plan of the Benjamin Bosse High School Which Stands in a Parked Fifteen Acre Tract.

in the center of the building with a light court on each side and extends through the height of the two floors, with a balcony.

In the balcony there is a fireproof moving picture booth with room for two machines and a switch controlling all lights in the room. As in so many of the designs of the Joseph C. Llewellyn Company, Architects, there is a combined stage and gymnasium. In this school it is the girls' gymnasium and the boys' gymnasium is separate. The stage is quite complete for meetings and entertainments, having overhead lights and footlights, a drop curtain and scenery. This combined stage-gymnasium is 50 by 82 feet and can be closed off from the main auditorium by folding accordion doors which effectively shut off all sound, leaving a sufficient stage space on the auditorium side to carry on programs. Arrangements are provided by which all scenery and gymnastic apparatus can be hoisted to the "flies" when basketball games are being staged. Spectators in the auditorium seats can witness these games in exceptional comfort. The out-of-bounds line is sufficiently far



Exterior View of the Benjamin Bosse High School, Evansville Indiana, Which Cost Nearly $745,000. Joseph C. Llewellyn Company, Chicago, Architects.



Community Room of the Benjamin Bosse School. View taken from the stage.

from the front of the stage to obviate any danger.

Boys' and girls' showers, locker rooms and store rooms are located back of the stage. Above these is located the boys' gymnasium, 90 by 100 feet, with special stairway from the boys' shower room to the gymnasium. A special locker room is located alongside the boy's shower room with special full length lockers for the first team and a drying cabinet heated by hot air blast. The arrangement of the girls' shower room provides a set of five dressing compartments to each two showers with extra compartments for large classes. The office of the girls' physical director is located just to the east of the stage. It has a waiting room, store room, examination room, private office and shower.

Just to the east of the auditorium is located a well arranged cafeteria, fully equipped to serve 1,000 students. The cashiers are so located that three entrances can be used.

The fireproof construction of the stage allows the location of the heating and power plant in a sub-basement beneath the shower rooms. Two generator units provide electricity for the entire building and the exhaust steam from these is used in heating the building. The "split"



Class Room for Mechanical Drawing, Benjamin Bosse School.

system of heating is used—blast for ventilation and direct radiation for taking up heat losses, which seems to be the approved method of heating schools today. The auditorium, gymnasium and each side of the building can be heated and ventilated separately. Quite an extensive power plant has been provided consisting of two 200 H. P. water tube boilers with stokers and forced draft, capable of maintaining 175 per cent of boiler rating, which is equivalent to 700 H. P. The ash disposal is arranged so that the ashes are blown into an elevated tank and dropped from the tank into wagons, for hauling to any desired dump.

The building is of the fireproof type throughout, having brick walls, Indi-



A View of the Library, Benjamin Bosse High School.



Biology Room, Benjamin Bosse High School.

ana limestone trim, granite sills and steps, concrete floor construction with terrazzo floor finish except in gymnasiums, community room and classrooms, where maple or oak floors are used. The oak trim is finished gray, except in cooking rooms, where the wood is white enameled. All flat roofs are of the asphalt built-up type and all pitched roofs of tile, with copper gutter and flashings. The desks, tables and laboratory fixtures are of cabinet work, built to order.

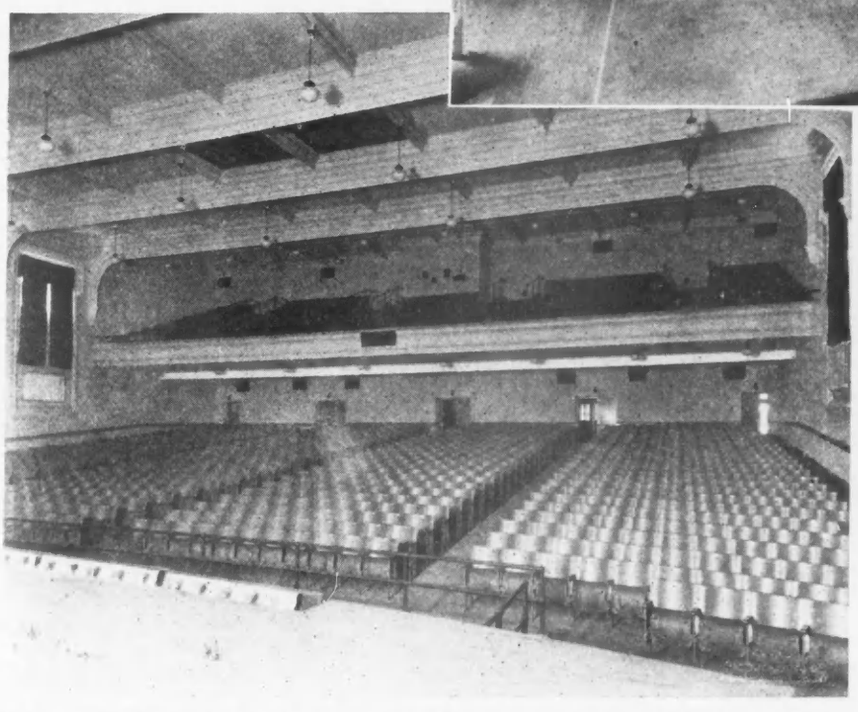
The building has been carefully planned throughout with a view to future extensions and the boiler plant, clock and telephone systems are capable of caring for these future extensions. The cubic contents are 2,486,690, making the cost per cubic foot 29.93 cents, a very low figure considering the fine facilities provided. The cost is divided as follows:

Building $683,792.95
Equipment 60,495.87

These figures are exclusive of the architects' fees, value of the grounds and landscaping. The building has now been in use for a sufficient period to prove its ease and economy of operation, administration and adaptability to meet all senior high school conditions.



Cooking Room, Benjamin Bosse School.



This Fine Auditorium of the Benjamin Bosse High School Seats 1,450 People.

Study Co-operative Apartments

DURING the coming year the Co-operative Apartment Section of the National Association of Real Estate Boards will make a study of the use of roofs of apartments for such purposes as bungalow sites, playgrounds, tea rooms and roof gardens. Other subjects to be studied are: the best co-operative use of basements, the building of apartments to suit the buyer and improved layouts, designs for families with children, heating systems, built-in features, lighting fixtures, and ventilating systems and radio equipment. All of these should prove profitable and the committee's report will be awaited with interest.

A Beaufiful Church Memorial

Designed by Allen and Collens, Architects

AN outstanding example of merit in church design and decoration is to be found in the Leslie Lindsay Memorial Chapel, being the new chapel of Emmanuel Church, Boston. The architects, Francis R. Allen and Charles Collens, and the builders, L. P. Soule & Sons Company, of Boston, together with certain English craftsmen,



The Leslie Lindsay Memorial Chapel, Boston, Mass. Erected by her parents in memory of a daughter, who was lost, with her husband, in the "Lusitania" disaster, May 7th, 1915.

stained glass and altar designers, have achieved a chapel of rare beauty.

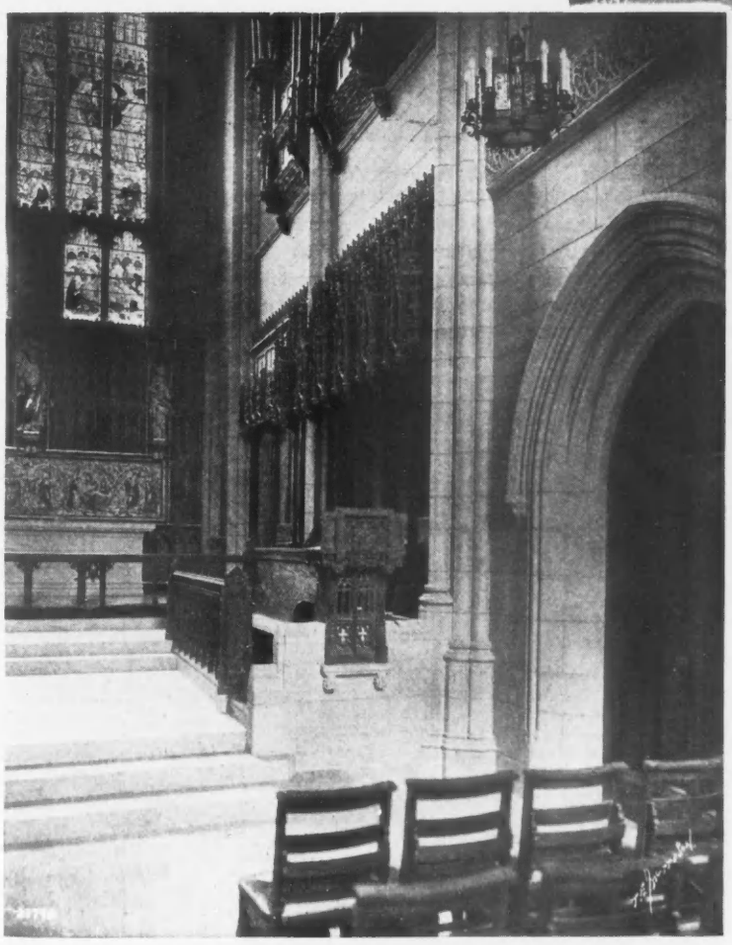
This chapel is a memorial by the bereaved parents to two victims of ruthless submarine warfare, in the sinking of the "Lusitania," May 7, 1915—Leslie Lindsay and her husband, Stuart Southam Mason. The architects of the chapel have written some interesting comment on its design:

"The Leslie Lindsay Memorial Chapel is conceived in no one distinct type of architecture, but combines features from the best examples of the various periods of English Gothic. In general form and proportions, it follows the precedent of the English perpendicular, but the lower arcading of the nave is decidedly early English, and the tracery of the windows has certain features that recall the Decorated Periods. The charm of most of the early ecclesiastical buildings in England is due largely to mixture of styles incidental to construction at various periods, and it was felt that this departure from a fixed type would enhance the architectural value of the work. Certain conditions of the site, such as a narrow lot and the blank walls of the adjoining buildings, contributed to the difficulties of design, but provided eccentricities of treatment which have proved far from detrimental.

"The exterior is built of the same stone as Emmanuel Church, a Roxbury conglomerate, which is rich in brown and warm colors, offset by the lighter quality of the Indiana limestone trim and tracery. Under the great nave window, a low-



The Leslie Lindsay Memorial Chapel, Boston, Mass. A close-up view of pulpit and part of choir stalls showing the rich carving over the latter.



Another View of the Lindsay Chapel Looking Towards the Altar. Note the chair type of seats in place of pews.

vaulted entrance porch leads into the nave, whose stone vault rises to a height of 46 feet, extending to the north seven equal bays, a distance of 85 feet. The last bay forms the chancel, with a deep traceried sanctuary arch. The side walls are pierced with windows only in two places, but this lack of fenestration is counterbalanced by an applied arcade with a rich carved cresting and the panels of warm Bath stone, the lofty slender columns, and the rich fan tracery and carved bosses of the groined ceiling.

"The entrance and vestibule doors are richly carved in oak, with saints, angels and foliated designs. Immediately inside these doors to the left is the stone font with a pinnacled and traceried oak canopy above the iron-bound door which opens onto the silver baptismal bowl.

"The floor of the nave is of Travertine marble, a happy contrast to the Bottichini marble of the chancel, floor and steps and the Bath stone chancel rail and the Caen stone pulpit base. The pulpit, choir stalls and lectern are of oak, richly carved, the lacework patterns of the canopies rising in crocheted finials against the warm background of the Bath stone walls. The choir stalls are designed with the medieval misericordia seats such as one sees today in the ancient choirs of the monastic orders, where the hinged seats were so arranged that the monks could get some partial support when standing through the long ceremonies.

A New Y.W.C.A. Building Follows the English Colonial Style



The Tea Room and Cafeteria of the New Evansville, Indiana, Y. W. C. A. Are Arranged so That They May Be Divided Into Separate Dining Rooms for Individual Groups Whenever the Occasion Requires or May Be Thrown Together to Form One Large Dining Room.

DURING the week ending October 10, Evansville, Ind., residents supplemented by hundreds of visitors from various sections of the Tri-State territory comprising southern Indiana and Illinois and western Kentucky, celebrated the formal opening of the new Young Women's Christian Association Building, a $200,000 structure of brick, stone and concrete exemplifying the English theme in architectural motif, a type that is expressive of a striking combination of beauty and service.

In addition to its being a welcome addition from the standpoint of architecture, the new building, cleverly embodying the several departments usually associated with the larger centers, is the concrete realization of a cherished ambition of public-spirited citizens to efficiently equip the local organization with means to meet present-day local association demands.

The new building is located at Second and Vine streets, with a frontage of 145 feet on the latter street. The floor plan resembles a T and including the rear wing gives the structure an overall depth of 150 feet. The front section is 58 feet wide. The rear wing, comprising swimming pool and gymnasium, is 63 feet deep by 48 feet wide.

This building in its three stories and basement includes all the desirable elements which make it both an attractive home for girls and a community center. The English Colonial idea is at once apparent in the doorway entrance, and the green shuttered windows of residents' dormitory rooms harmonize effectively. It is said to be the first building here to be constructed in English Tudor style of exterior wall brick, a local fire flashed brick of red into which has been combined a bluish tone. The white limestone trim harmonizes with telling effect.

The main entrance opens upon an attractive lobby adjoin-



On the Main Floor of the New Y. W. C. A. Building Are Found the Office, Parlors, Dining Room, Kitchen and the Gymnasium.

English Colonial Y. W. C. A.

ing which are the various departmental secretary offices. A wide corridor with floor of terrazzo traverses the section lengthwise. Walls and ceilings of tan with a deeper shade to waistcoting height add to the cheerful tone. The same color scheme prevails largely throughout the entire building.

The corridor terminates at one end in a large reception room 51 by 27 feet. This apartment continues the English Colonial idea both in the construction features and in the furnishings.

At the other end of the section the corridor enters upon the tea room and cafeteria so arranged that it may on occasion be divided into separate dining rooms for individual groups. A large kitchen equipped with modern service conveniences adjoins the tea room. Secretarial offices and small reception rooms complete the first story arrangements.

The second story of the main section is largely devoted to meeting and social rooms of the several associations and groups. There are five such rooms varying in size, and so arranged through sliding partitions, as to be thrown into one assembly hall. The main reception room, 42 by 24 feet, on the southern side, has its own adjoining kitchenette. Board meeting rooms, office, cloak room and five sleeping rooms for transient residents complete the second story plan.



The New Home of the Evansville, Ind., Y. W. C. A. Is a Structure of Brick, Stone and Concrete Employing the English Colonial Style of Architecture to Good Effect.

The entire third story is given over to the sleeping rooms for permanent residents, with matron's room, emergency room in cases of illness, sitting room, small kitchen, laundry, shower baths and lavatory. There are twenty-one dormitory rooms in this story.

The basement story of this section is largely devoted to departments incidental to the swimming pool and gymnasium of the adjoining rear wing. There are sixty individual steel dressing closets, shower baths, lavatory with hair-drying equipment, and bathing suit storage equipment. Heating equipment rooms and rooms for the help comprise the remainder of the story.

The rear wing of two stories consists of the swimming pool in the first story and gymnasium in the second story. The bathing pool room, 60 by 48 feet, is divided by a concrete balustrade into divisions for bathers and spectators. The swimming pool measures 20 by 60 feet and has a capacity of 57,000 gallons.

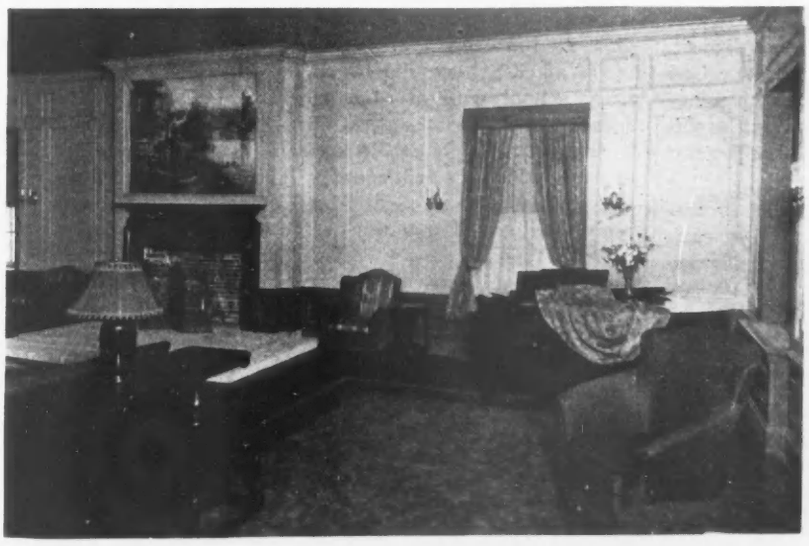
The entire pool and landings were poured in one solid concrete block. The entire interior of pool and space reserved for bathers is covered with white tile with depths of the water marked in green tile. The depths vary from 3 to 8½ feet. A system of continuous filtration is installed. Water is kept in constant flow. The pool may be drained in two hours or filled in four hours. The water is pumped into the tank through a heater at 95 gallons a minute so regulated that it is kept at a comfortable temperature in all seasons. A vacuum cleaning system which may be operated while the tank is filled cleans the pool.

The other section of the swimming pool room is arranged in varying levels for use as a spectators' gallery on occasion of aquatic contests.

The gymnasium occupying the second story of the wing is 48 feet wide by 63 feet long, providing ample space for large classes in gymnastic work, basket ball and other indoor games. It is equipped with a complete series of apparatus for corrective physical culture work. A spectators' gallery extends around four sides.

The new building was designed by W. F. Thompson and Blanche Geary, architects, New York City, specialists in designing buildings of this nature, with Charles L. Thompson, Evansville, associate architect. The M. J. Hoffman Construction Company, Evansville, were responsible for the general construction contract.

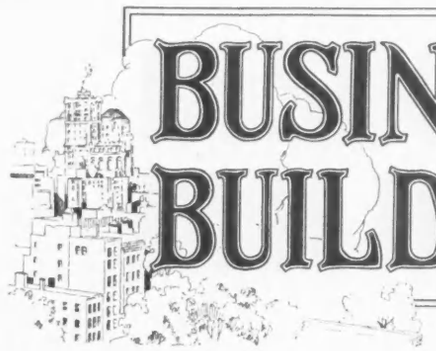
—William H. O'Connell.



A Social Hall, at One End of the Main Corridor, Carries Out the English Colonial Idea in Both Construction and Furnishings. It affords an ample space for the social activities of the association.

✣

"CONSIDERATION must be given to a study of the most suitable style of house for the location, considering the requirements of the family, the climatic conditions, the availability and suitability of building materials, the comparative costs in terms of service and the limit of the purse."



BUSINESS and PUBLIC BUILDINGS in COLORS

16 Designs Presented Including Four Retail Shops, an Auto Sales Building, a Tourist Camp, a Filling Station, a Large Theater, a Church, Two Public Schools, a Public Comfort Station, a Dairy Barn and a Multiple Story Public Garage

IT is interesting to look back over the building designs of a former day and realize the constant evolution which is taking place in design. It is gratifying indeed when these trends are unmistakably in the right direction. Fortunately, we are able to present in the section in full colors which follows, evidence of a present-day trend towards better designs for business and public buildings such as are required in nearly every community.

And we believe that the beauty of this presentation—sixteen full-page plates in four-color lithography—will do much to inspire our readers in the cause of better designs. These plates have the same vivid, glowing colors and are embellished with the same type of art work which have made AMERICAN BUILDER Home Designs in Colors so effective and popular.

Often the gain in appearance from better designs adds little, if anything, to the cost of a building—let us say, a store building. It may mean the cutting of a few more jack rafters, the flashing of a few extra valleys and the use of a slightly more expensive roof covering of permanent color. But frequently the better design merely changes the outlines and proportions of the building so as to make it conform to a certain style of architecture or design of a distinctive period. And so, as we progress farther into the twentieth century, we find ourselves combining modern American business and public requirements with styles and periods of design which have become classic.

A comparatively modern trend in suburban communities is the community retail buying center, designed and built at one time in architectural harmony—yet with pleasing variety of detail. Such a project is the "Queen's Buyway," shown so attractively on Plate 4. It is a recent project, scarcely, as yet, completed in old Hyannis in the Cape Cod summer resort region of Massachusetts. The Dutch windmill in the background proclaims that this is Dutch architecture, which is quite fitting so near the sea, where the salt air blows in from Nantucket sound.

Continued expansion in the use of automobiles necessarily creates a demand for certain types of buildings, such as automobile sales and service stations, needed in increasing numbers all over the continent. Attractive appearance in the buildings which house them means much to the success of these agencies. The Kullberger Agency, shown on Plate 5, has found their business greatly quickened since moving into their new building.

Touring by automobile continues to grow in public favor and there is a great and growing need for tourist rest camp buildings throughout the United States. Each season will see more of them built. Travelers by motor are quite apt to gauge their impressions of a town by the nature and extent of the tourist camp facilities provided. That is the thing which, personally, concerns them most. No such camp is complete without a pavilion which provides cooking, bathing and toilet facilities. At least one large lounge and eating room, with fireplace, is desirable, together with dining porches, kitchens and separate showers and toilets for each sex. The design shown on Plate 6 will repay inspection, as it is an excellent solution of the average tourist camp pavilion problem.

Trends of Church Design

The present day trend in church design is interesting and worthy of study. It is particularly well exemplified in the church plan by Talmadge and Watson, presented on Color Plates 10 and 11. Analysis of these plans will show that more space has been devoted to departments for the young people of the church than to the church auditorium proper. No church can grow and develop as it should without attracting the young people. The molding of character is also most effective during youth. Among the features of this Berwyn church are a gymnasium, an assembly and dining room with a stage at one end, a kitchen, a men's club room, a ladies' parlor and a cloistered space with grass and outdoor pulpit. More of these features will be incorporated in church designs in the future.

School Building Designs

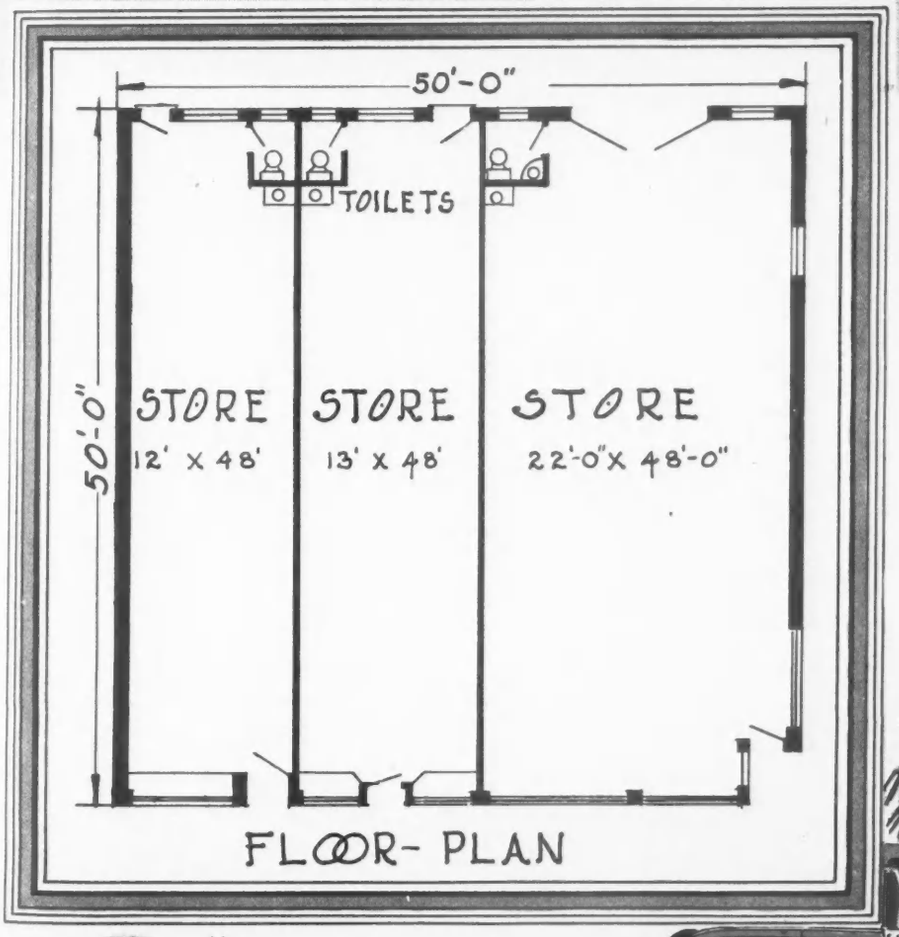
Changes in the trend of public school design are exemplified in many fine new structures today. Public school requirements will continue to grow as there are many old fashioned school buildings still to be replaced. These older buildings are disappearing before more advanced educational ideas and the apparent advantages of the newer designs. A number of very fine school designs are presented elsewhere in this issue in addition to the two small schools illustrated in Color Plates 12 and 13. It will be noticed that the Walker School, illustrated on Plate No. 13, is a one-story school with all departments on the ground ffoor. Almost all school designers advocate this feature, but find it difficult to apply in the case of the larger schools and on sites which are inadequate. The one-story school illustrated shows an excellently well balanced plan with clever use of skylight illumination which is one of the possibilities for this type of school. Inspection of the floor plan will show that all departments are provided for, as well as possible future extensions.

Public comfort stations are needed in cities all over the United States. They are a public necessity, essential to the health and welfare of congested districts everywhere, needed more than ever since the disappearance of saloons which formedly provided some slight facilities.

Even in such small structures as park pavilions and public comfort stations, there is ample room for good design. This affects the outer appearance of the building, its entrances, interior arrangement and equipment. The one shown on Color Plate 14 is a splendid illustration of what may be accomplished in the design of such a building.

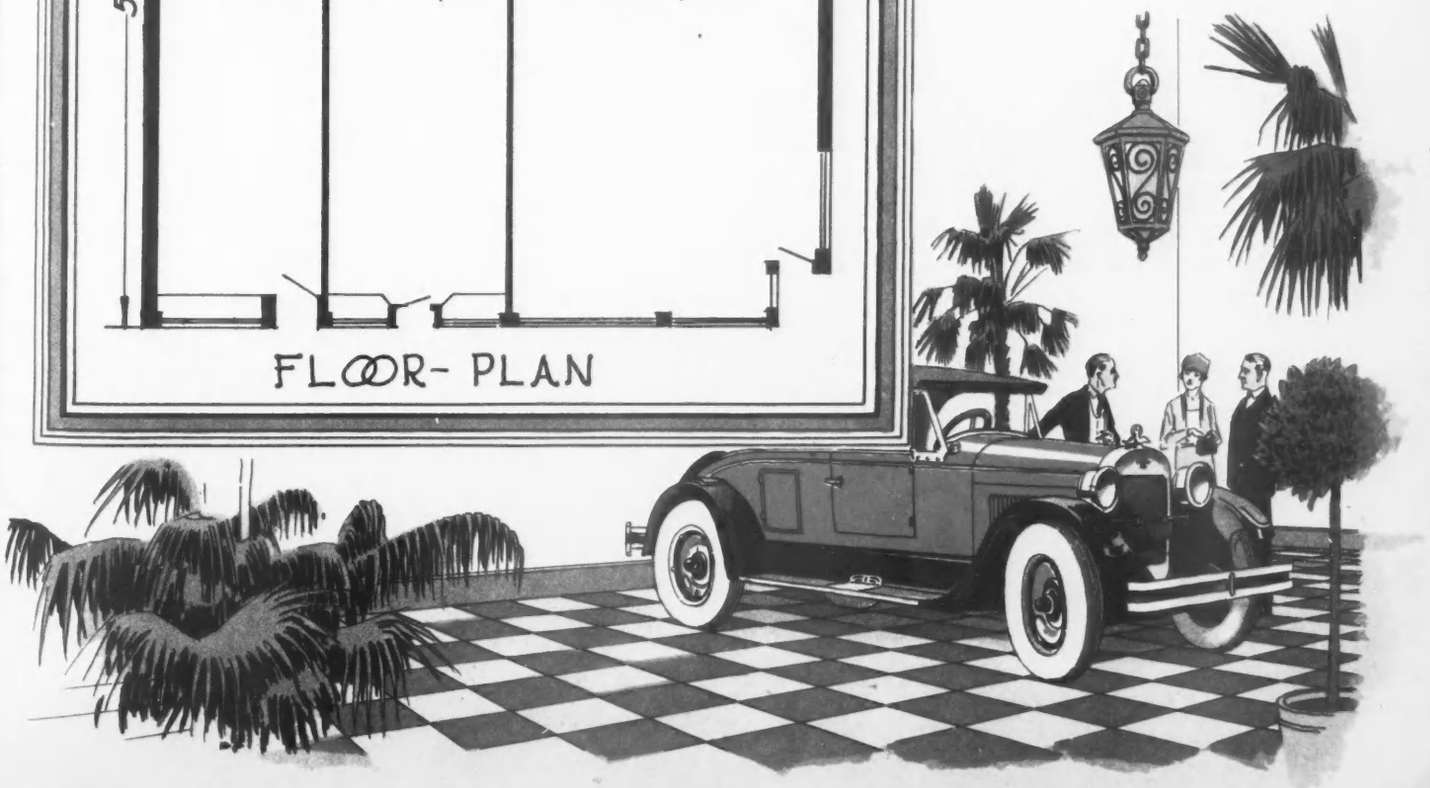
Group of Stores, French Design



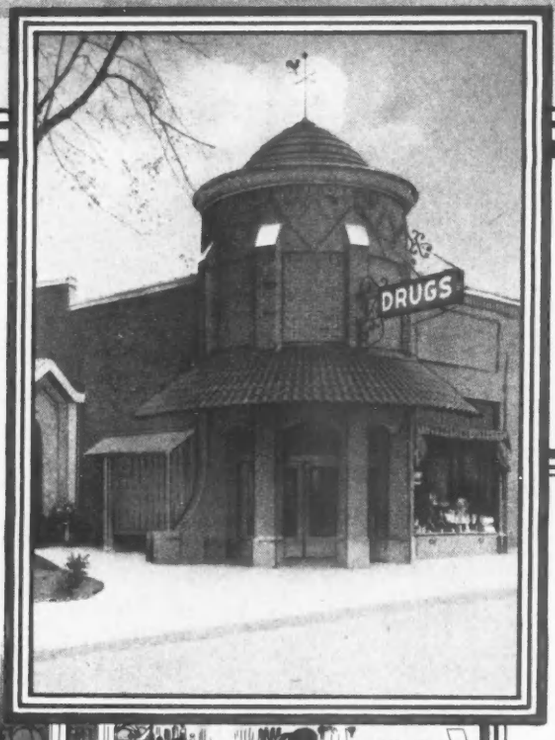


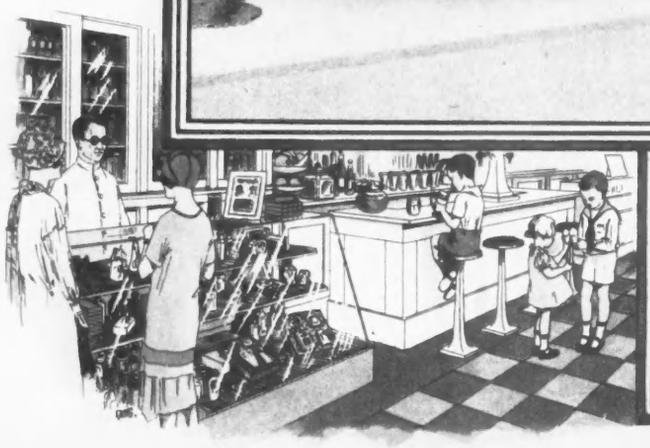
Pat. March 15, 1921 and Sept. 30, 1924.
Copyright 1926. Wm. A. Radford, Chicago.

THREE shops of individual character developed on a corner site 50 by 50 feet. The corner one 22 feet wide, the others 13 and 20 feet respectively. This group constructed at Danville, Illinois, attracts the best class of trade.



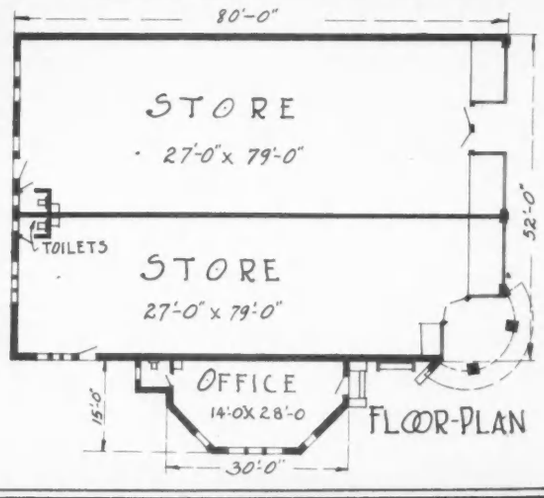






Unusual Corner Tower A Striking Advertisement

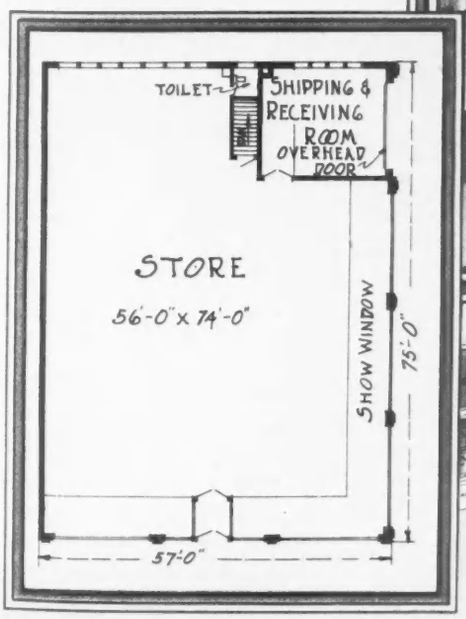
THIS new business building at Park Ridge, Illinois, facing a public park, realizes its business opportunity through good architecture. The drug store on the corner stands out prominently in the minds of buyers. The real estate office at the side, a half octagon, is unusual.

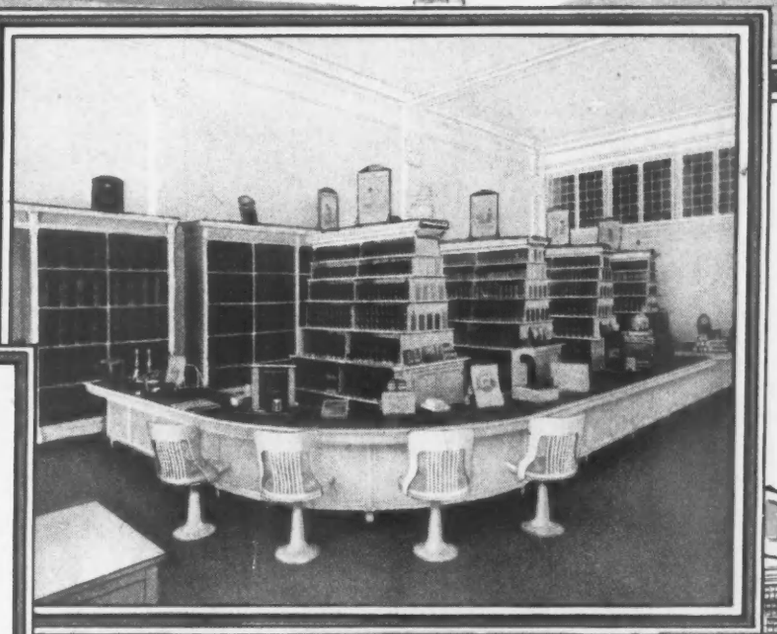


A Large Triple Store



HERE is a building suitable for the large mercantile establishment giving a high salesroom, broad and deep. Show windows are on two sides and a receiving and shipping room in one rear corner. Both exterior and interior views show the unusually good design and finish of this store building.







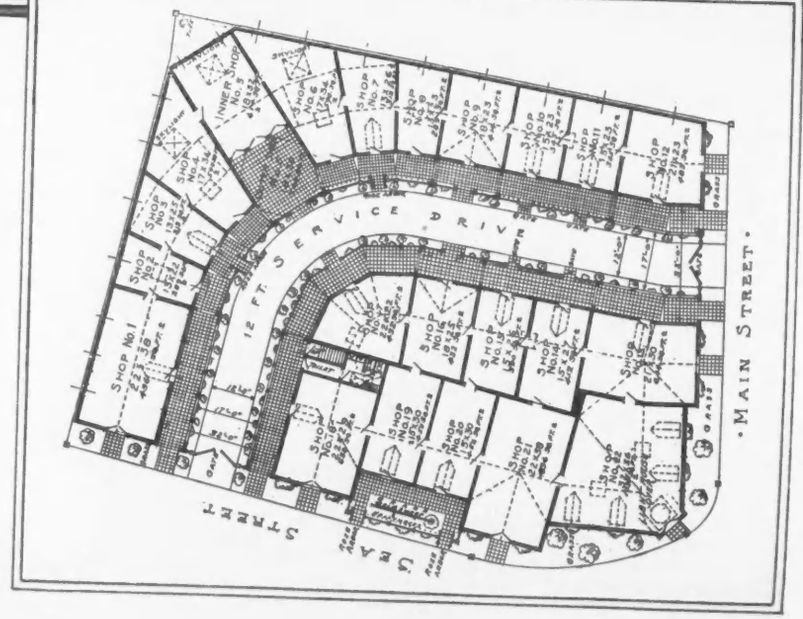
"The Queen's Buy-Way"

At Hyannis, Massachusetts, On Cape Cod. Whitten & Gore of Boston, Architects.

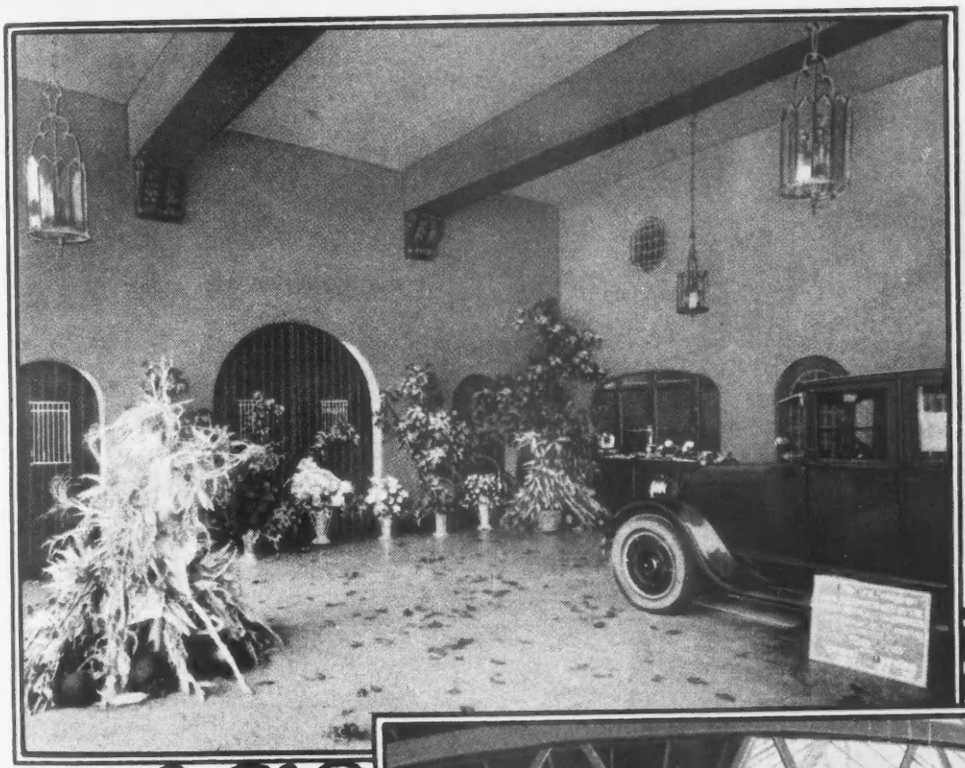




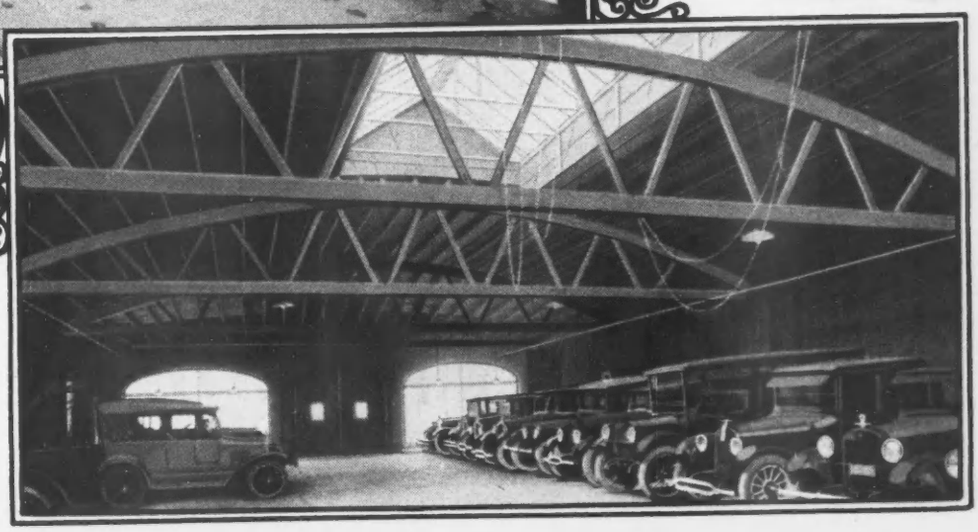
THIS is a very interesting group development containing twenty-two shops all designed in architectural harmony.











A Modern Automobile Sales and Service Building

Located on 75th Street near Stony Island Avenue, Chicago Buckley & Skidmore of Hammond, Ind., Architects.

THE officials of the Reo Motor Car Company appreciate the sales value of good architecture and urge their dealers to put up very attractive, adequate sales and service buildings. This building erected by Mr. Eric Kullberger is considered one of the best.

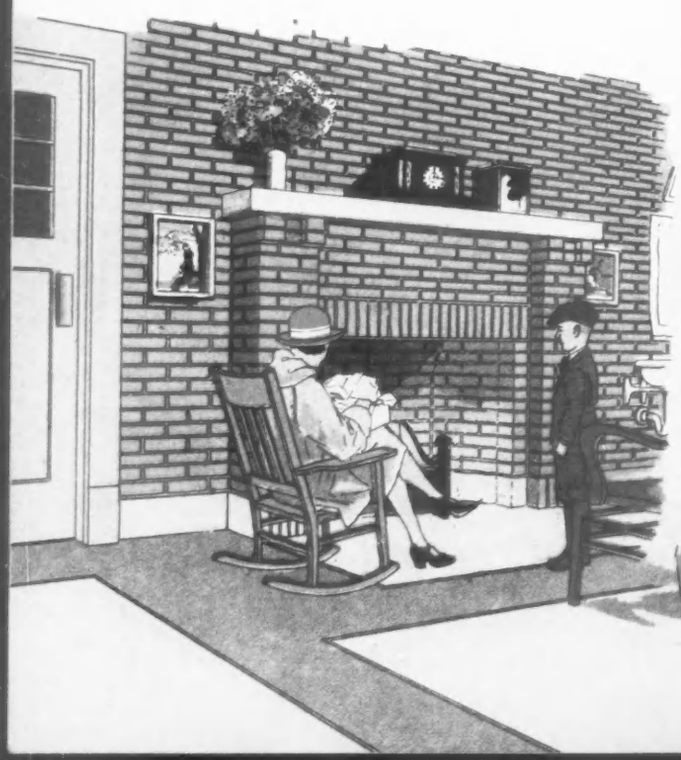
Plate 63

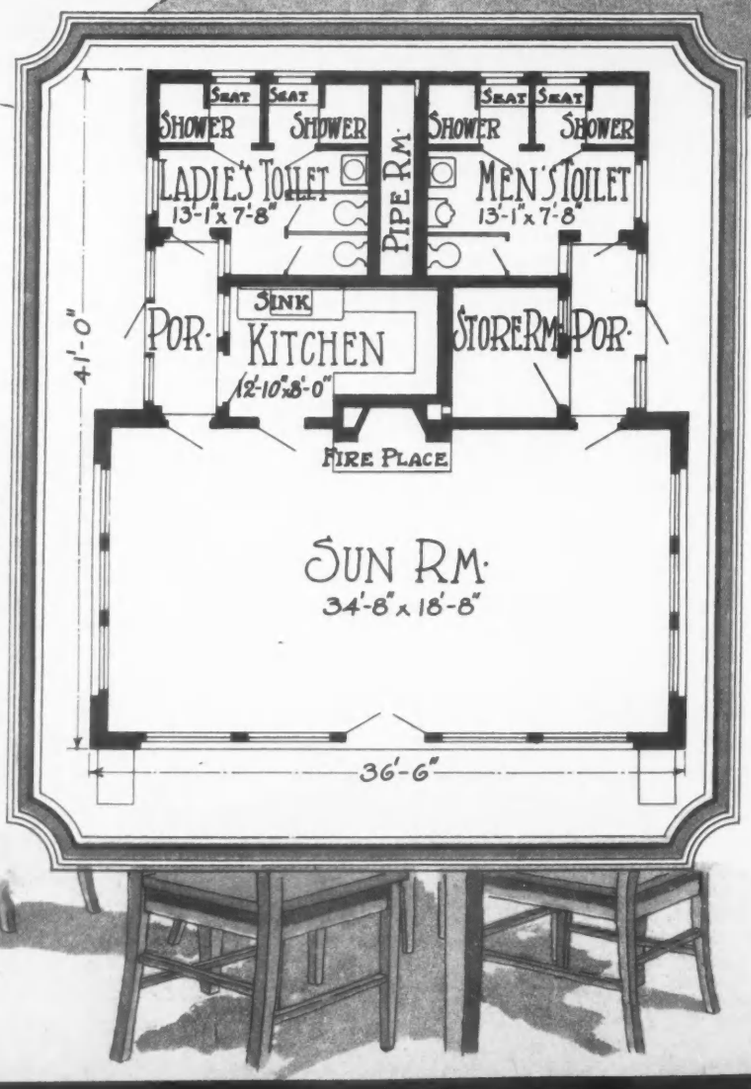
A Tourist Camp Pavilion and Rest House

The James Quickenden Park Pavilion,
Columbus, Wisconsin.
Clas, Shepherd & Clas of Milwaukee, Architects.



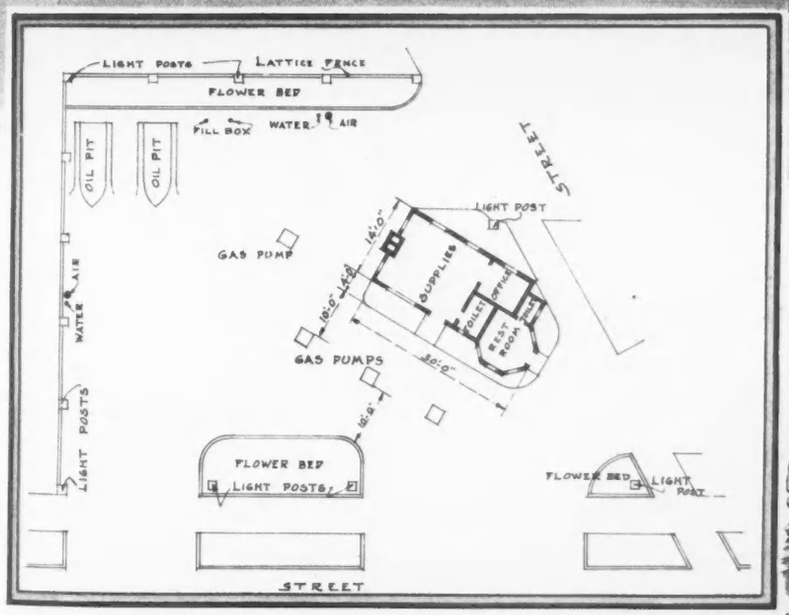
TOURIST camp buildings of substantial construction and good design are being put up in many communities. They furnish bathing facilities and a place where the travel-worn autoist can rest and refresh himself. This little building at Columbus, Wisconsin, is a good example of a simple, commodious layout. The main room is cheerful and home-like and the toilet rooms at the rear well arranged.



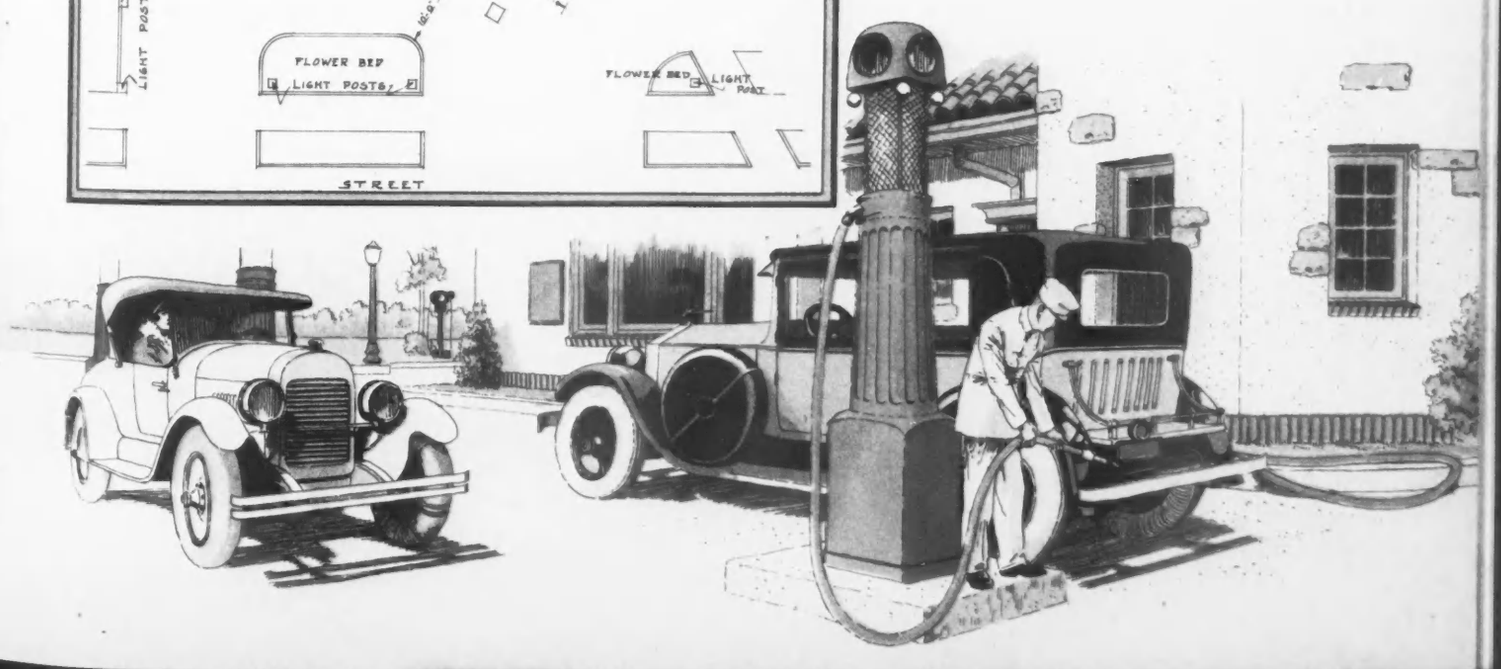


A Filling Station that Draws Trade





HERE is one of the latest ideas in gasoline filling stations as erected at Madison, Wisconsin. The distinctive architecture assures the motoring public of the service they desire and so brings business.

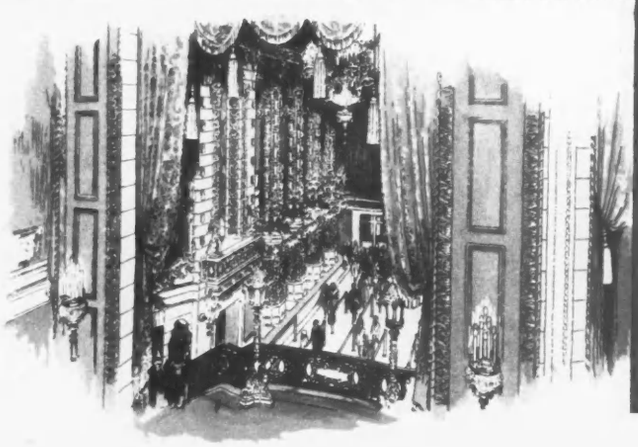


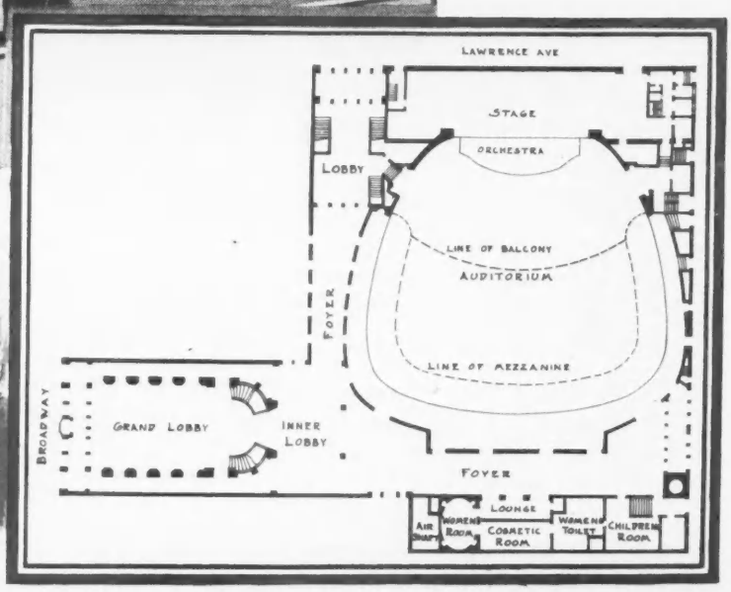
The Uptown Theater, Chicago

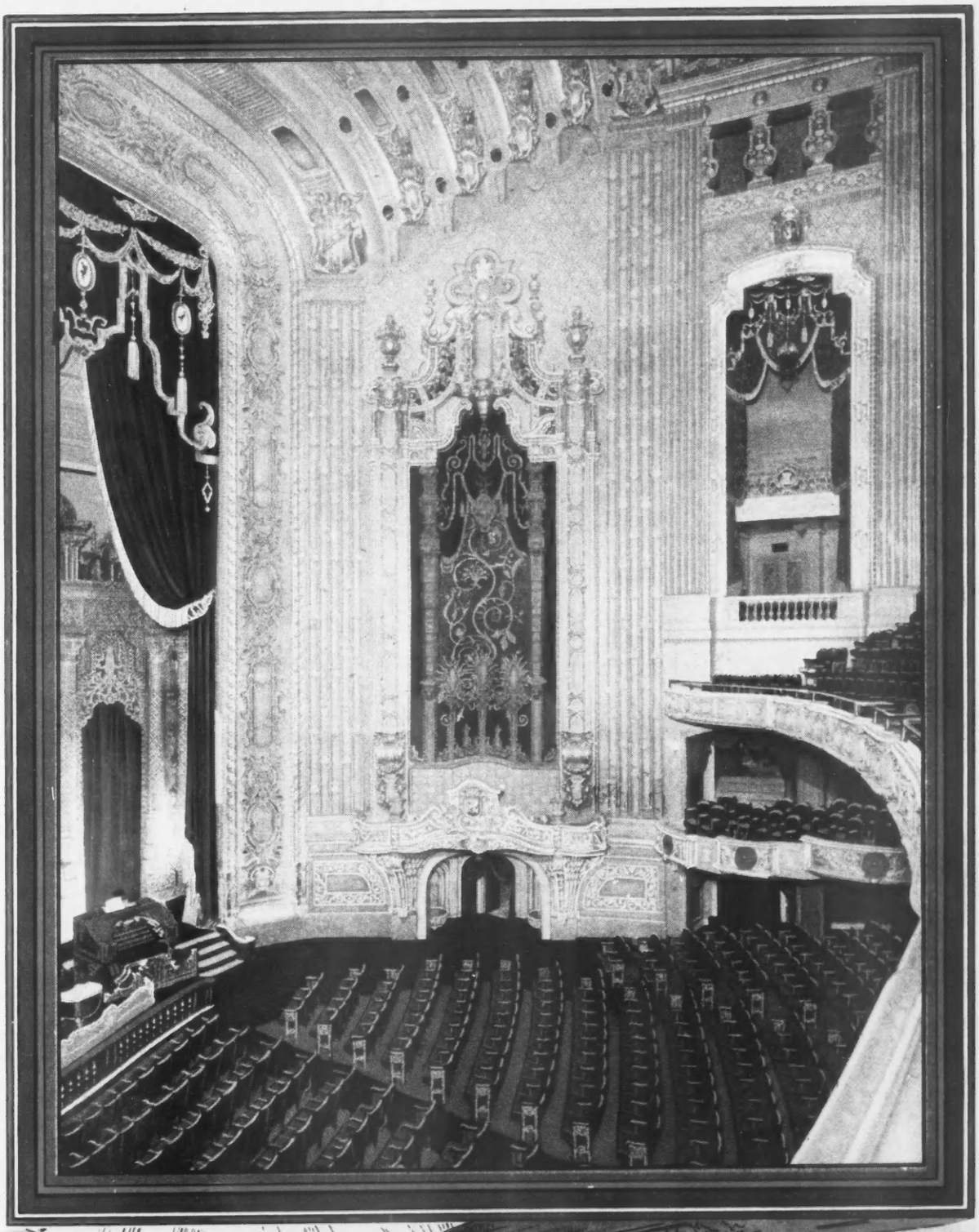
The New Wonder Theater of the Balaban & Katz Organization, C. W. & Geo. L. Rapp, Chicago, Architects

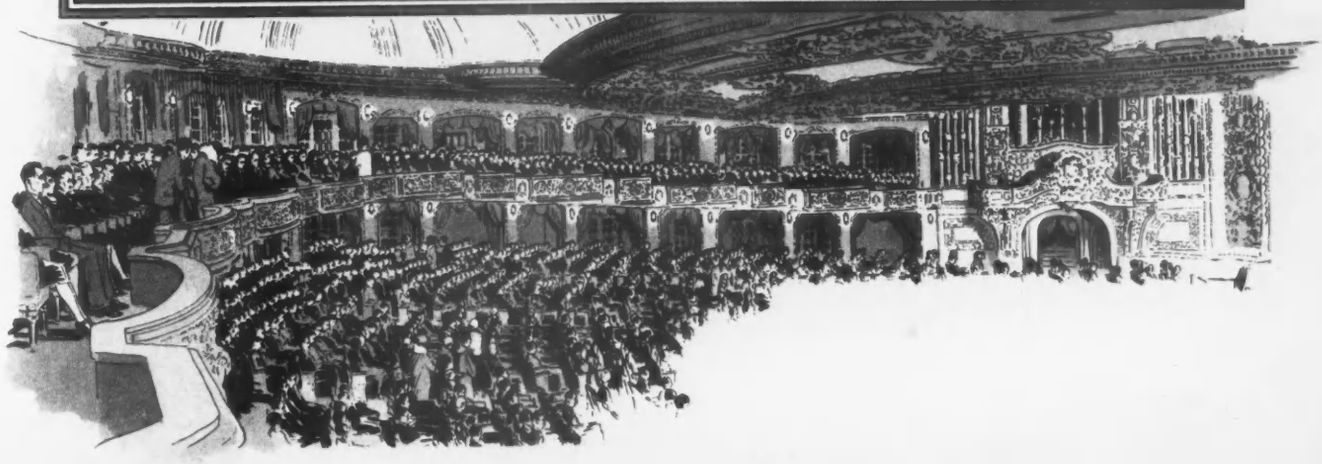


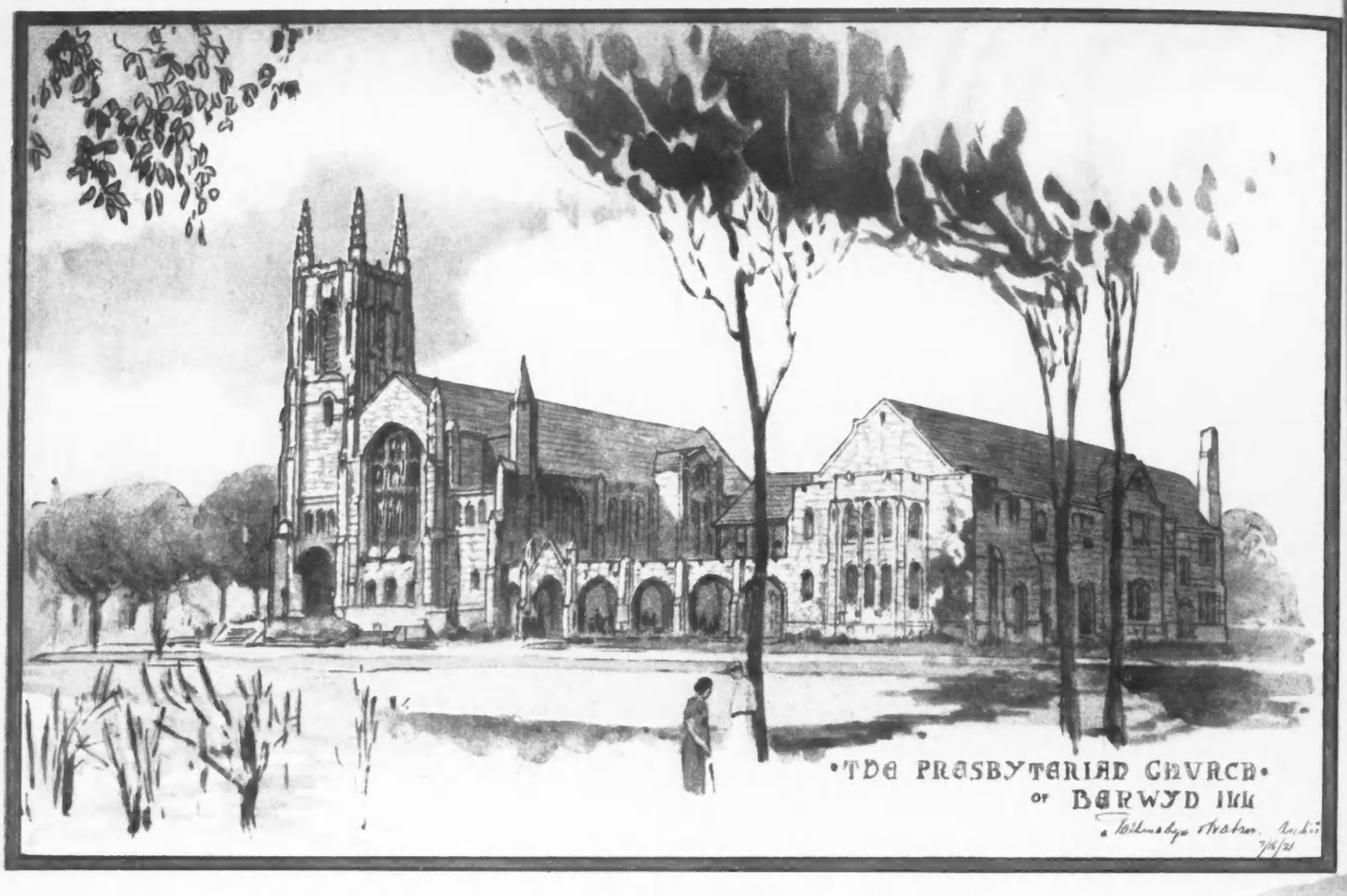
ON this and on the page opposite we illustrate exterior and interior views and floor plan of this magnificent moving picture theater.







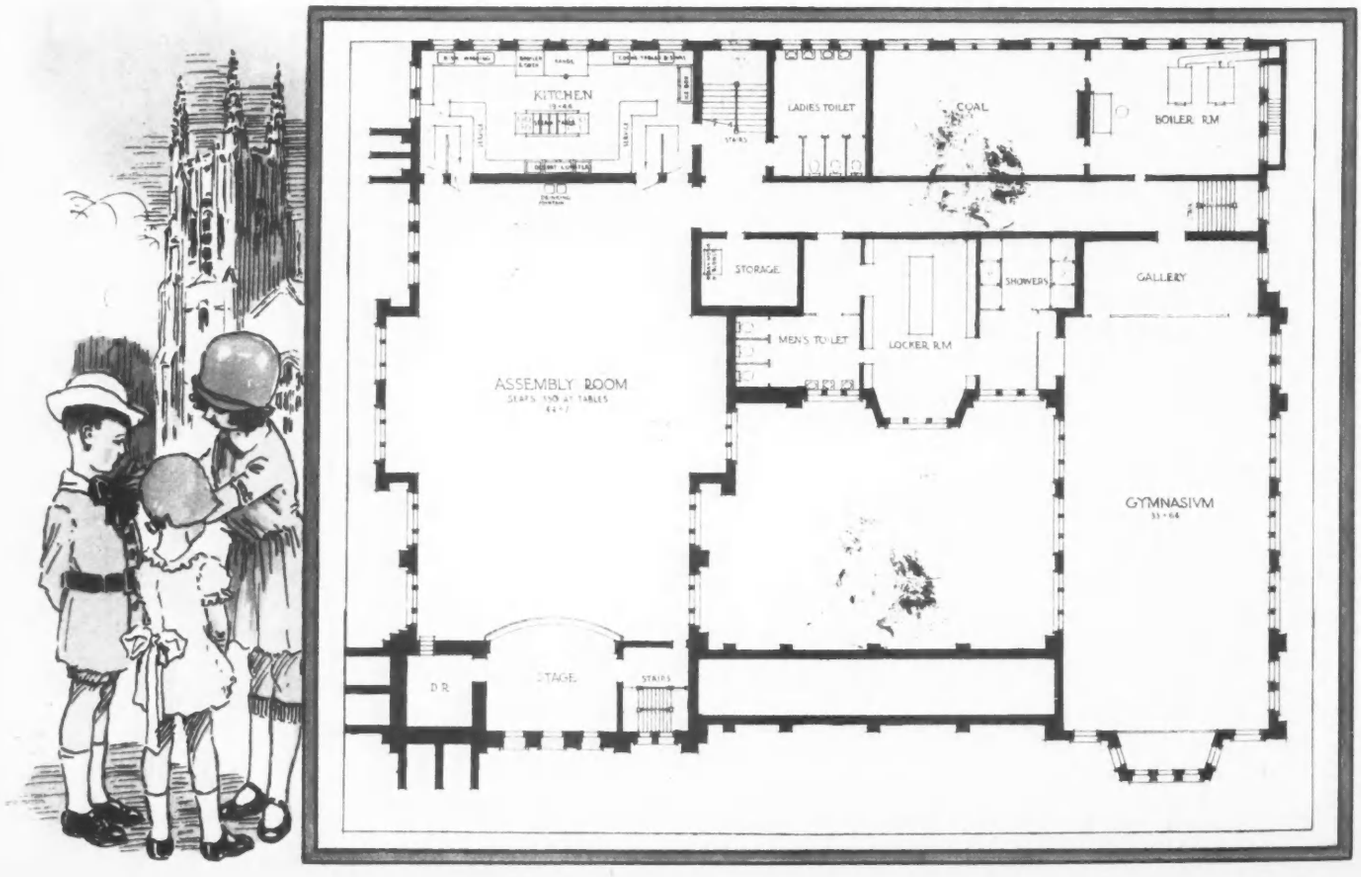


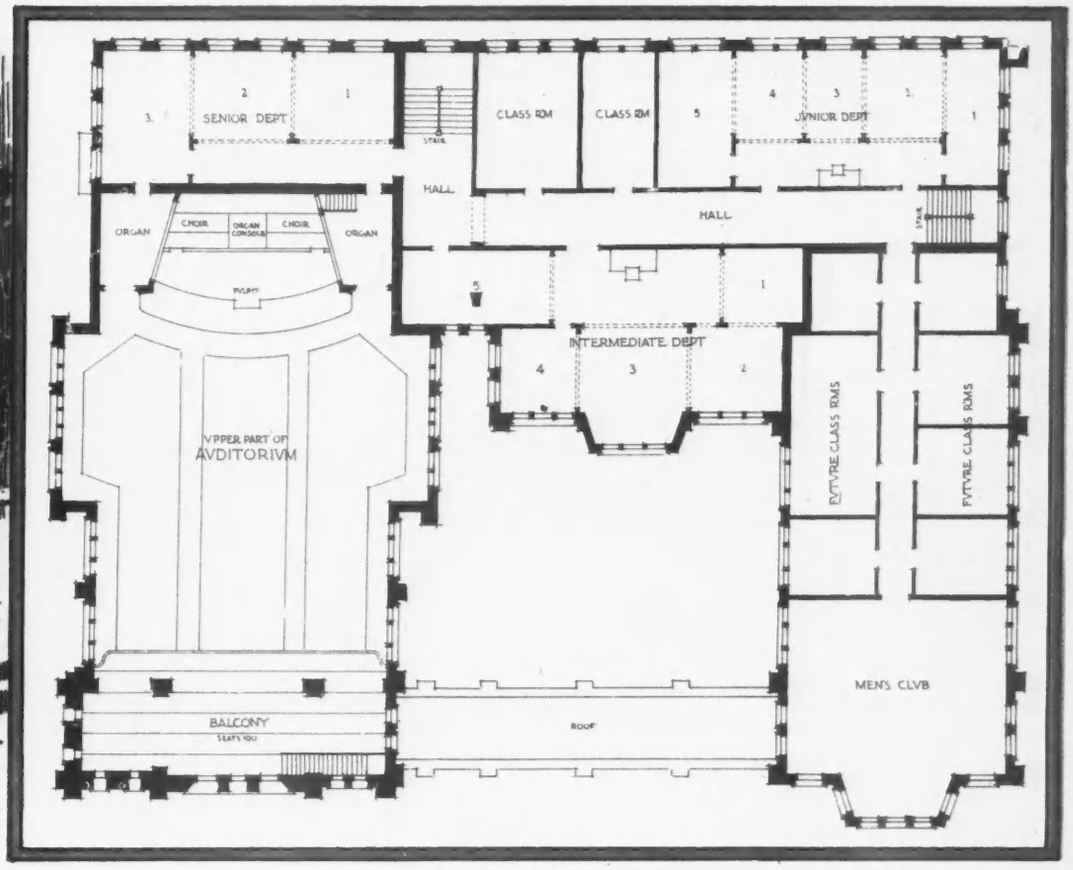


The Presbyterian Church of Berwyn, Ill.

Tallmadge & Watson of Chicago, Architects.

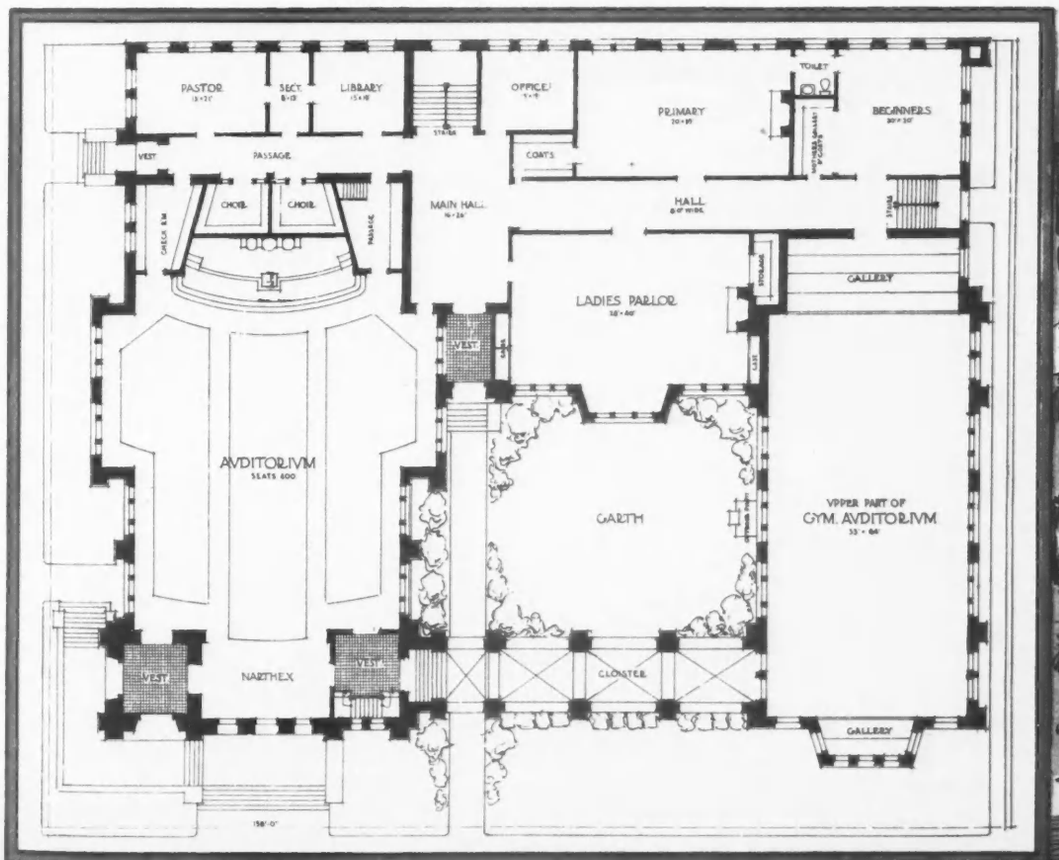
THIS view shows how this community church will look when completed. Below is the basement floor plan showing the assembly room, kitchen, locker rooms, gymnasium and heating plant.





ABOVE is illustrated the second floor plan of the Berwyn Presbyterian Church showing class rooms for the church school, the men's club, and the upper part of the church auditorium.

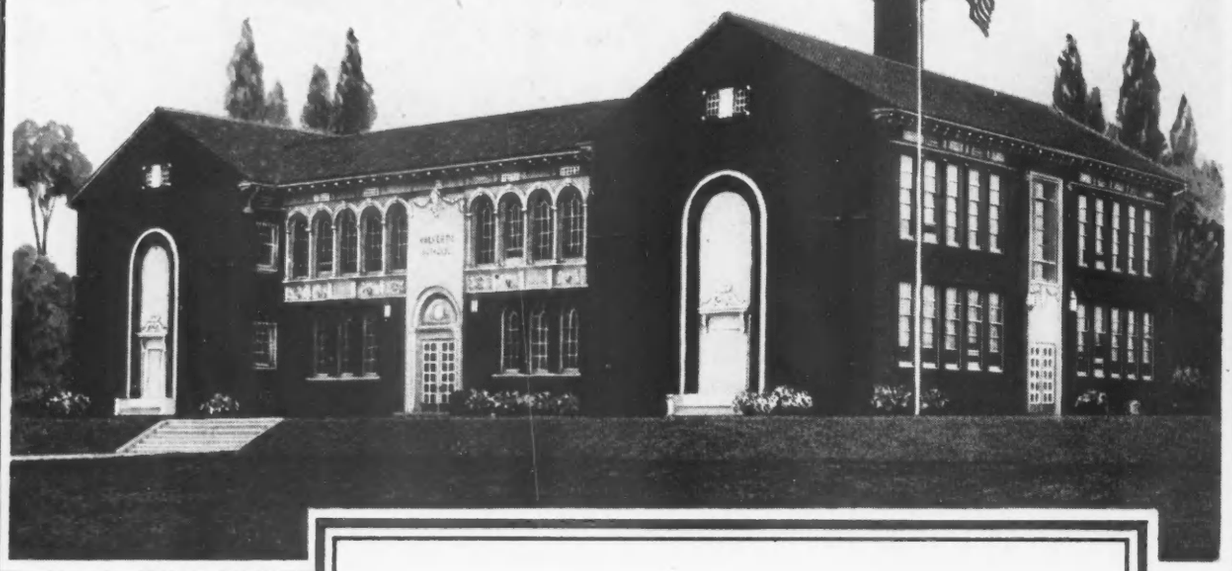
BELOW is illustrated the first floor plan of the Berwyn Presbyterian Church showing auditorium, church offices, ladies' parlor, kindergarten, gymnasium and outdoor meeting place.





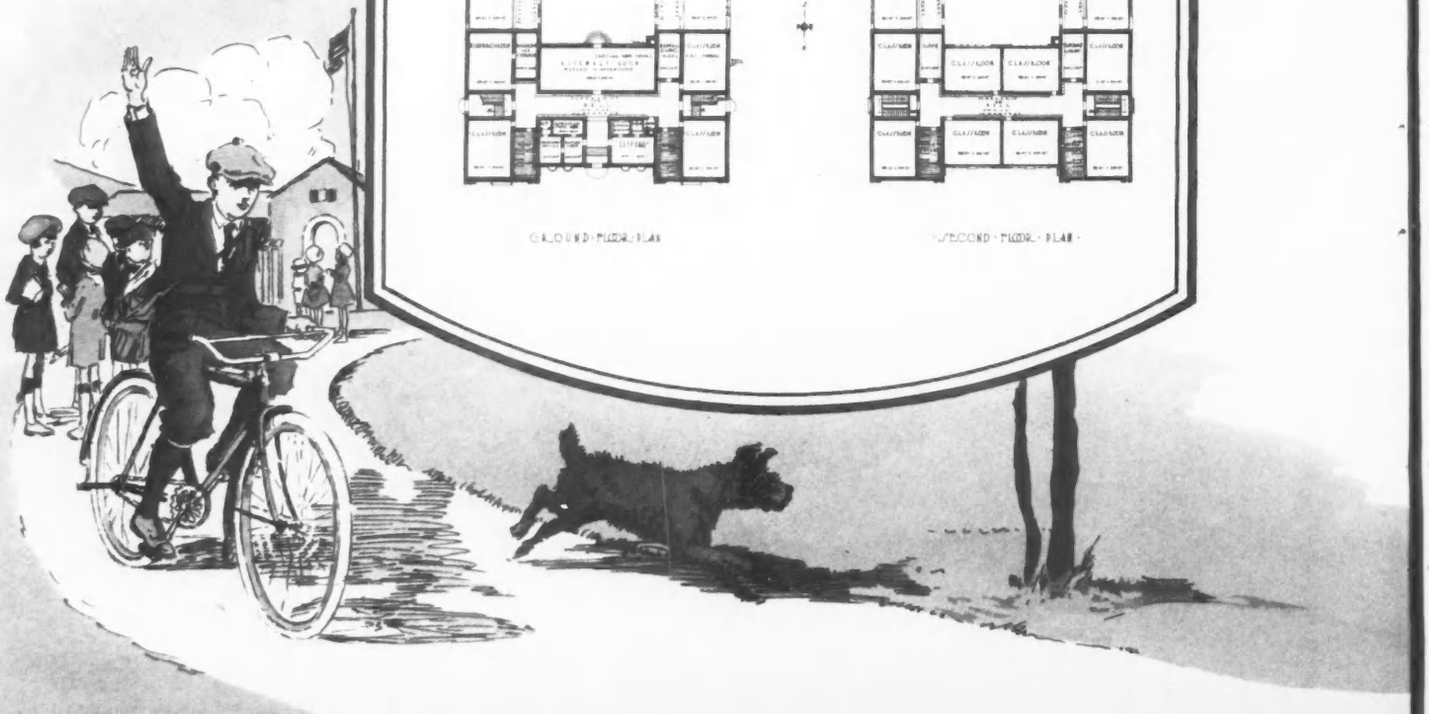
The Valverde Elementary School, Denver, Colorado

H. W. J. Edbrooke of Denver, Architect.



HERE is a good example of the primary school of two stories. Note on the plan the interesting provision for future expansion to the rear.

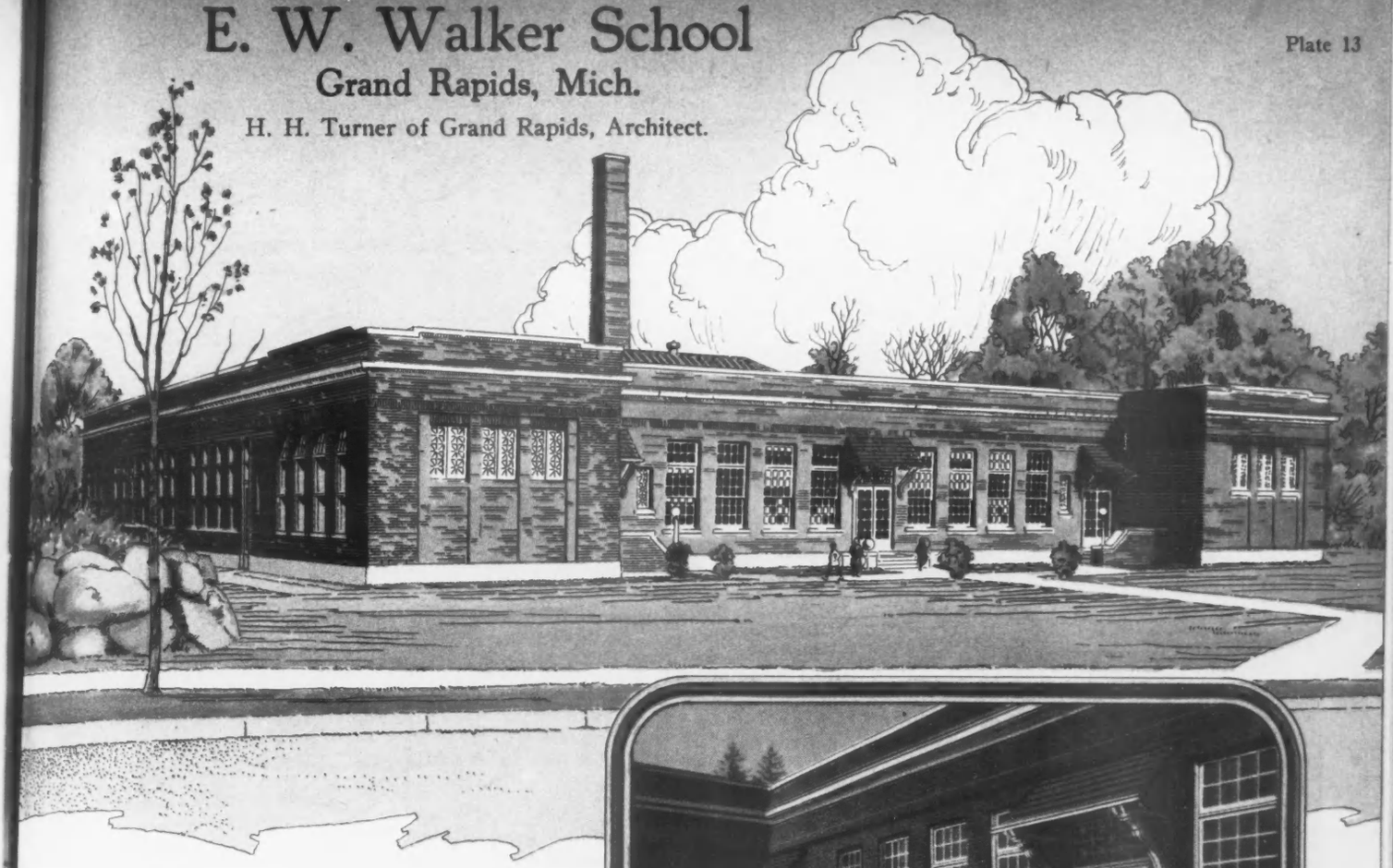


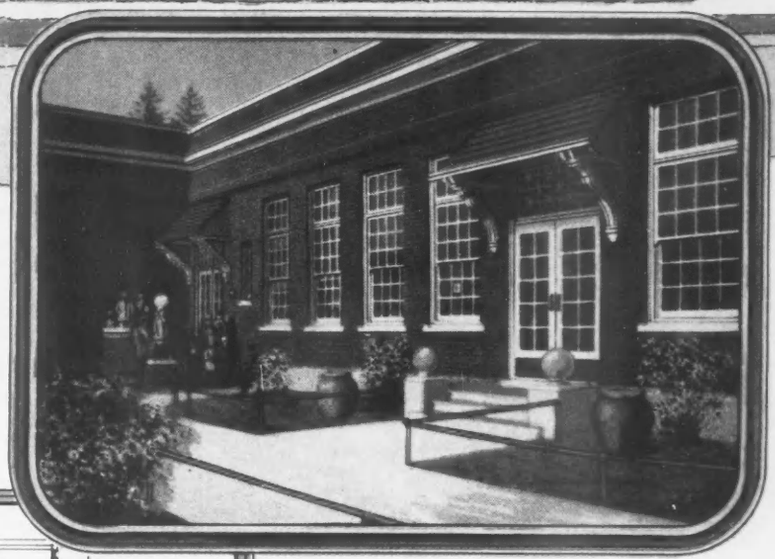


E. W. Walker School

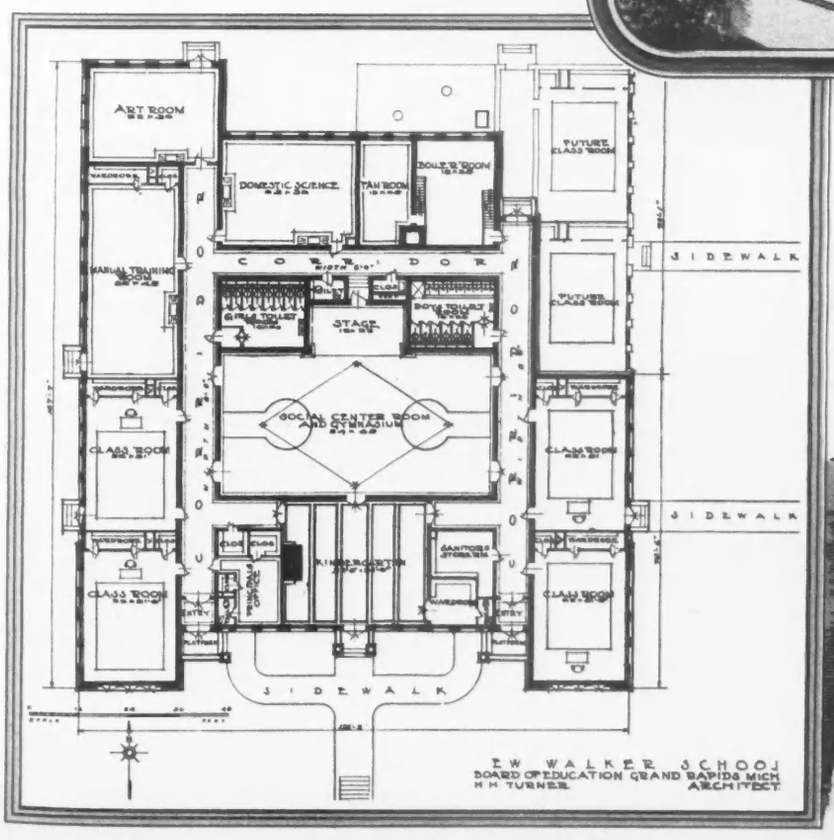
Grand Rapids, Mich.

H. H. Turner of Grand Rapids, Architect.



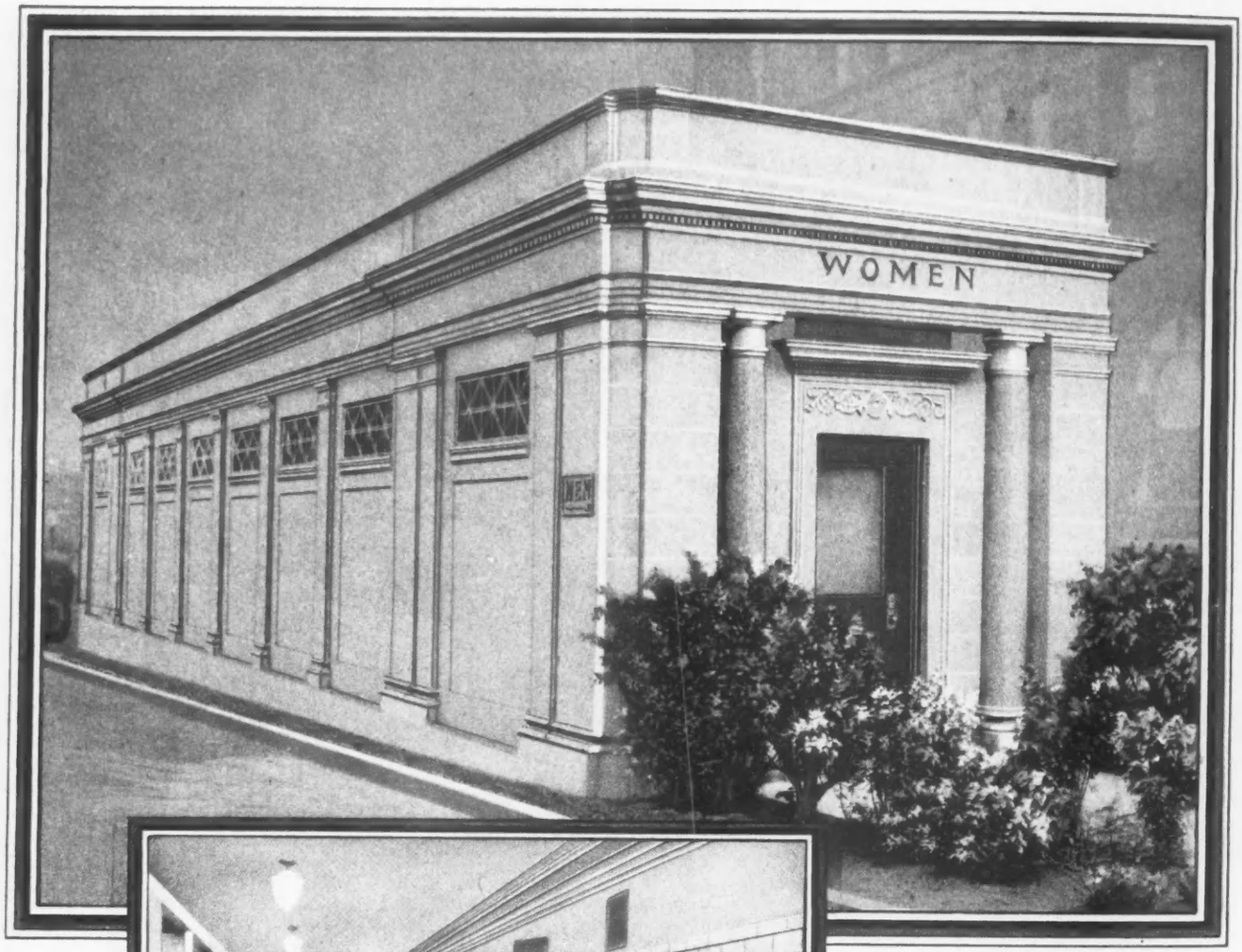


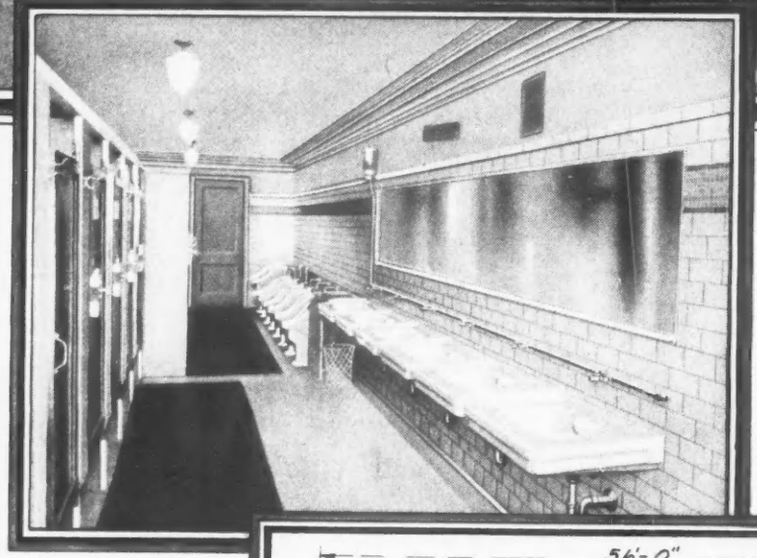
A GOOD example of the one-story type public school which is preferred in many communities, especially for the lower grades. A study of floor plan below will show how well this building is arranged both for school and community purposes.





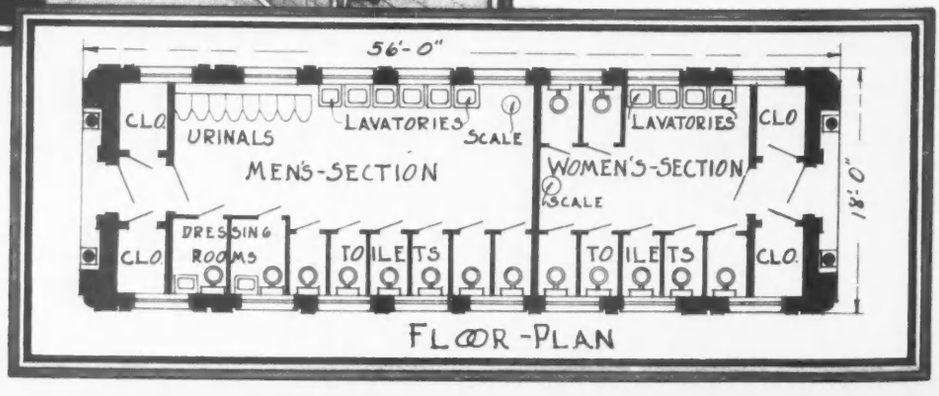
A Public Comfort Station





A Public Comfort Station

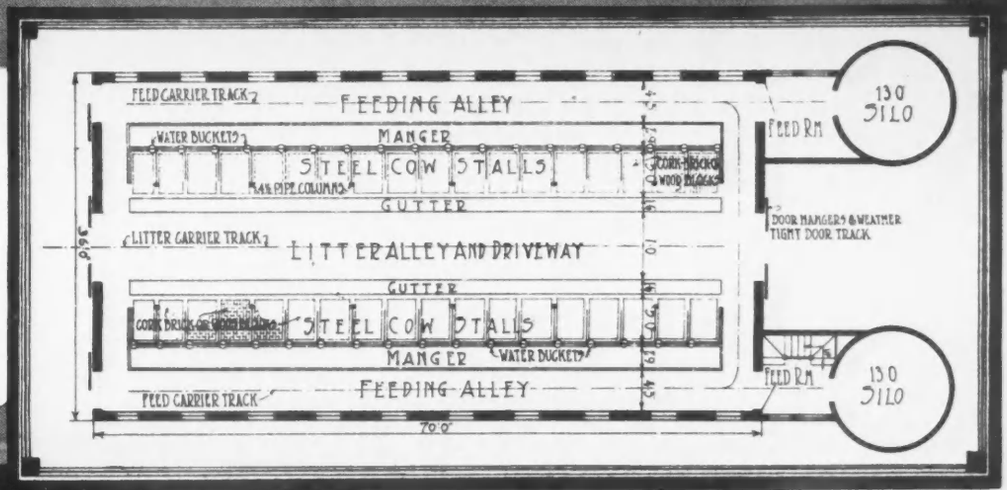
THIS comfort station at Trenton, N. J., H. A. Hill, Architect, is an excellent example of this type of building which is gradually finding its place in every up-to-date city community. A study of the floor plan and the photograph of the interior will reveal the excellent points of this design.

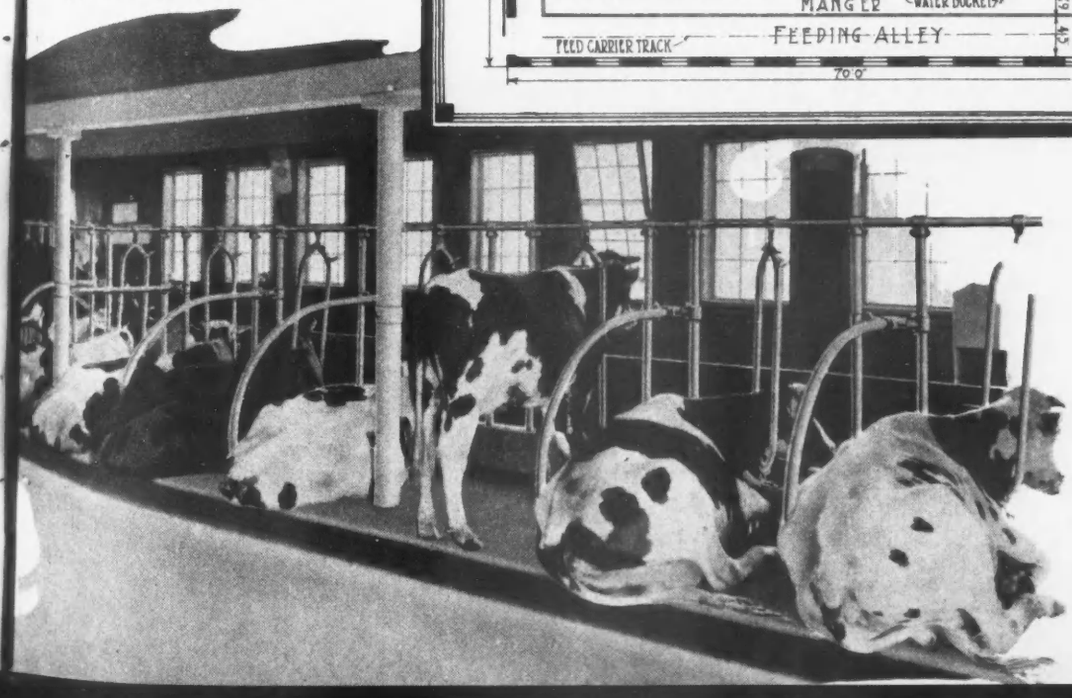




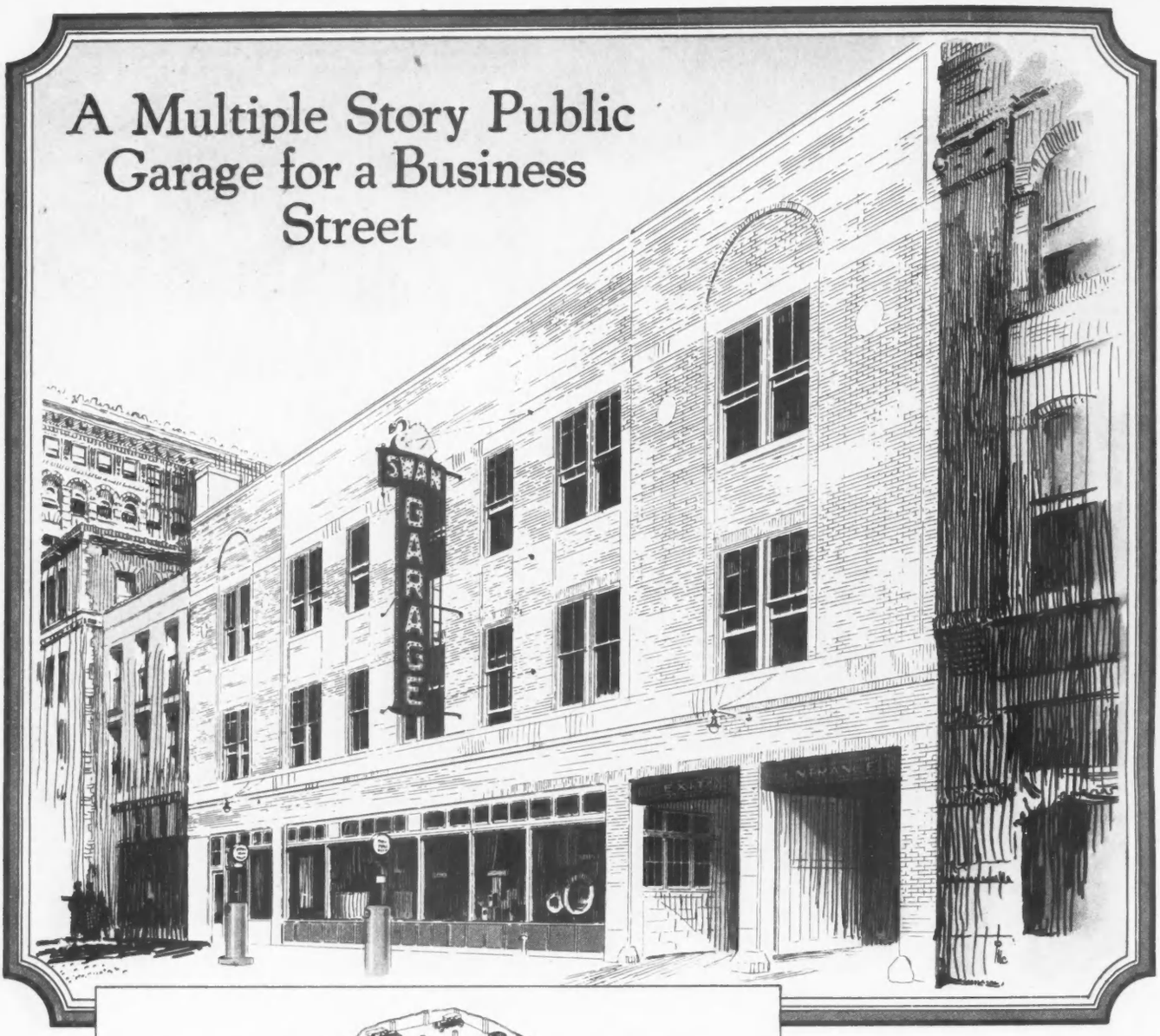
A Modern Dairy Barn

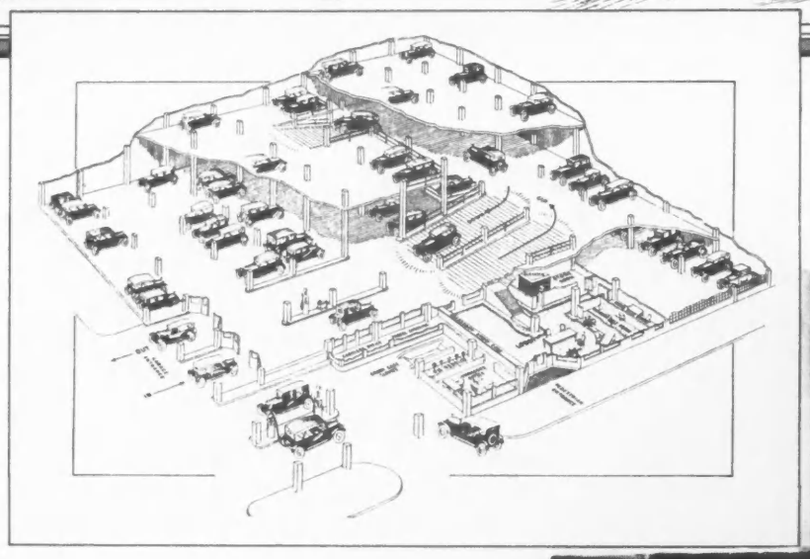
HERE we present a gambrel roof dairy barn of graceful lines, yet of very practical construction. The animals are comfortably stabled in this well lighted, well ventilated barn and their feed is conveniently stored in the large mow above and in the two big silos at the end.

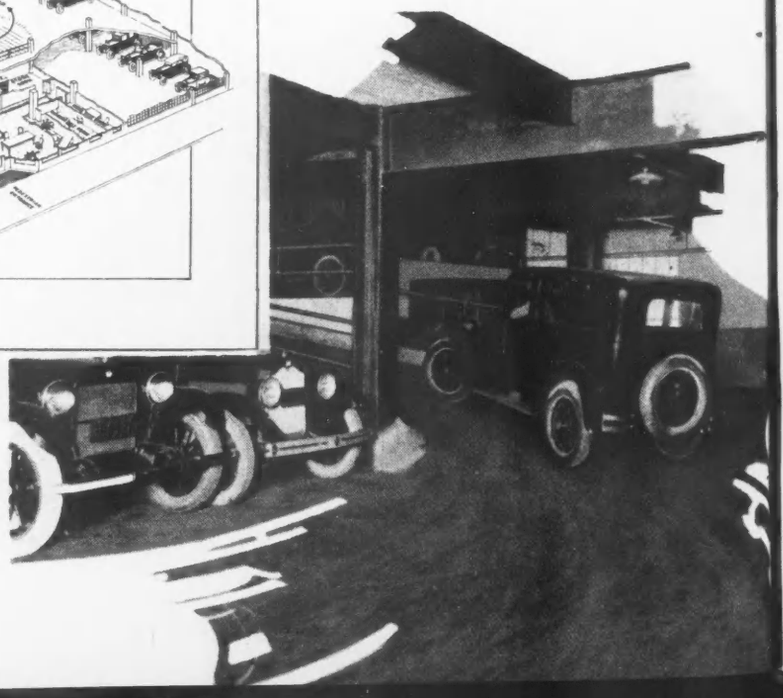




A Multiple Story Public Garage for a Business Street







THE Swan Garage, Buffalo, New York, F. J. & W. A. Kidd, Architects, is an example of the popular ramp construction where the cars are driven up under their own power to the upper floors. The system of easy ramps, each climbing one-half story at a time, is pictured in the diagram. In the heart of the business district where land values are high a multiple story garage is the only kind that can be made to pay; and there is a growing demand for parking, storage and service in downtown locations.

Bank Building of Pleasing Design





Kalamazoo Trust and Savings Bank Building, Kalamazoo, Mich., Weary and Alford, Chicago, Architects. The building is of reinforced concrete and has two large steel girders which span the banking room. An economic feature of this building is that space has been provided for a number of high class shops, and revenue from these leases is said to be sufficient to carry the investment in the entire building.

Bank and Office Building Presents Interesting Features

Safety Deposit Vault Is in Basement and Heating Plant and Ventilating Fans in Sub-Basement

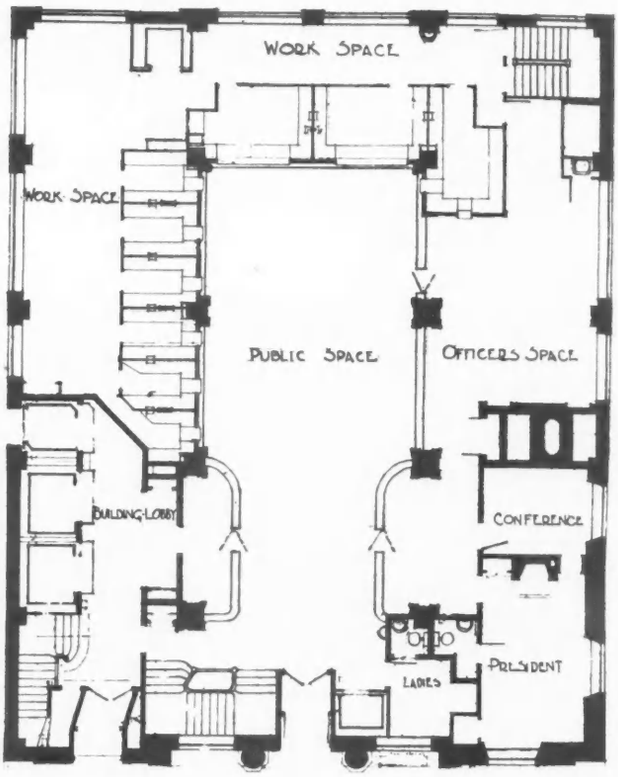
FERMOR S. CANNON, Architect

THE building which is devoted wholly to bank purposes—while advisable under certain conditions—is not nearly as good an investment as the combined bank and office building. In many cases, either will occupy the same ground area, while the revenue from the rentable office space will usually pay the bank a profit, besides carrying the investment on its own banking quarters. Then, too, the higher and more conspicuous building gives the bank desirable publicity and is impressive proof of tangible assets.

There are a number of interesting features in connection with the design and construction of the J. F. Wild Bank Building, Indianapolis, designed by Fermor Spencer Cannon, architect. For instance, the safety deposit vault being located in the basement, made a sub-basement necessary to contain the ventilating fans, plenum, etc., and the boilers and fuel room extending through both basements. In the sub-basement there is an unexcavated space surrounded by walls of reinforced concrete directly under the vault above. This renders the vault quite impregnable to burglar attack.



J. F. Wild Bank Building, Indianapolis, Contains Three Floors Devoted to Banking and Twelve Floors of Rentable Office Space.



FIRST FLOOR PLAN

Arrangement of Banking Floor.

When construction work was started the site was covered with a two-story brick-and-timber building, half of which was occupied by the J. F. Wild State Bank. The bank was a growing and progressive institution, and required special designing to care for its many departments, hence the safety deposit department, located in the first basement, commercial banking space on the first floor and bond department on the second floor. All bank floors are connected with stairways and two push-button elevators—one for busses connecting all floors with the book and money vaults in the basement, the other used for passengers.

On the basement level is a modern protected safety deposit and money vault, with coupon booths of various sizes opening off the lobby. Toilets and locker rooms are provided for employes and a book vault is located off the bus elevator lobby. Work rooms used for printing and storing supplies are next to the book vault.

The main floor has the usual complement of tellers' cages

with rather unusual design for the exterior or public lobby walls. Small roller curtains cover the windows after hours. The directors' room is a handsome oak paneled room with a marble and carved wood mantel. The president's office adjoins the directors' room, and a delightfully furnished ladies' room opens off the public space.

On the second floor around the main banking room are offices, vaults, toilets and a bond teller's cage. Provision is made for future extension of all service to the third floor when necessary.

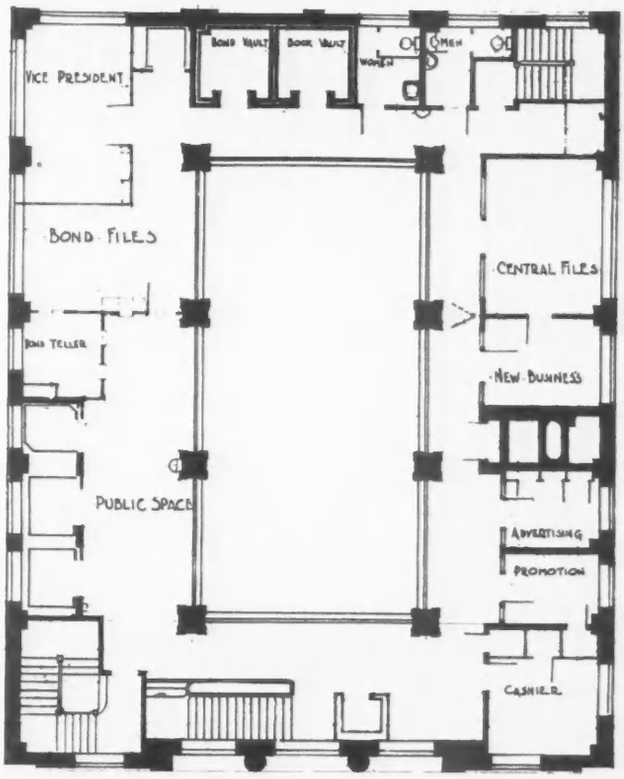
The public entrance lobby connects all elevators with the floors above. Three high-speed, variable voltage elevators serve the building, using an automatic starting device which permits of speedy and efficient service. Public toilets are massed on the sixth and seventh floors. The corridors have terrazzo floors and are light and comfortable in size. Particular attention was paid to the efficient lighting of all space.

The building was rented in large floor units, with very little subdivided space. Removable partitions are used throughout the office section where subdivisions are needed.

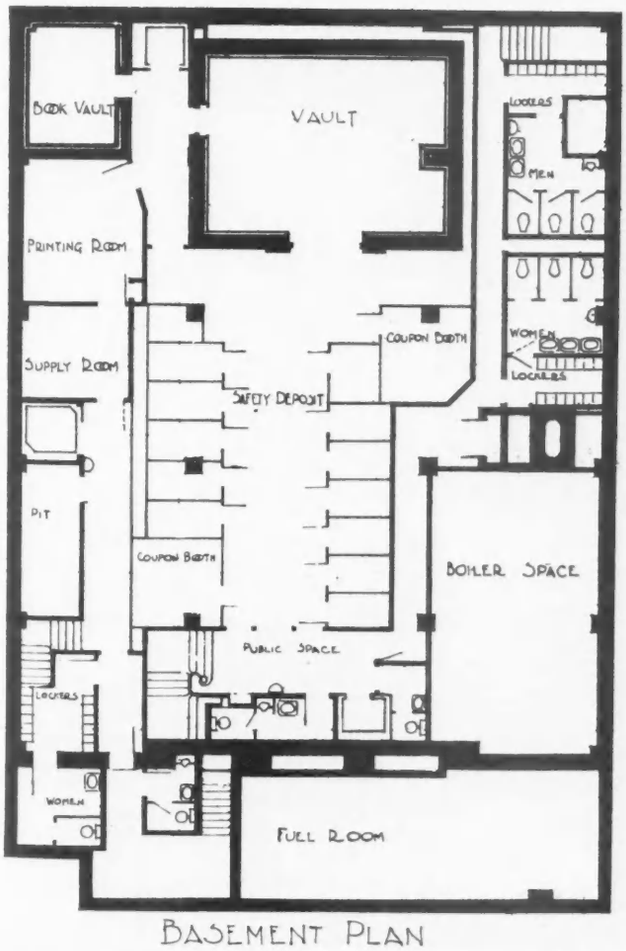
The heating and ventilating plant is located 22 feet below street level in the sub-basement. A battery of two smokeless boilers heats the building by means of a controlled vacuum vapor system. Ventilation is controlled automatically from well-distributed stations.

The use of terra cotta is unusually effective in the banking room and railing around the second floor. The background is a dark ivory polychrme, with the ornament done in light ivory. The modeling is especially refined. The plaster ceiling with recessed coffers makes a fitting and dignified crown for the very pleasant and efficient banking room. The check desks are of bronze in harmony with the interior design.

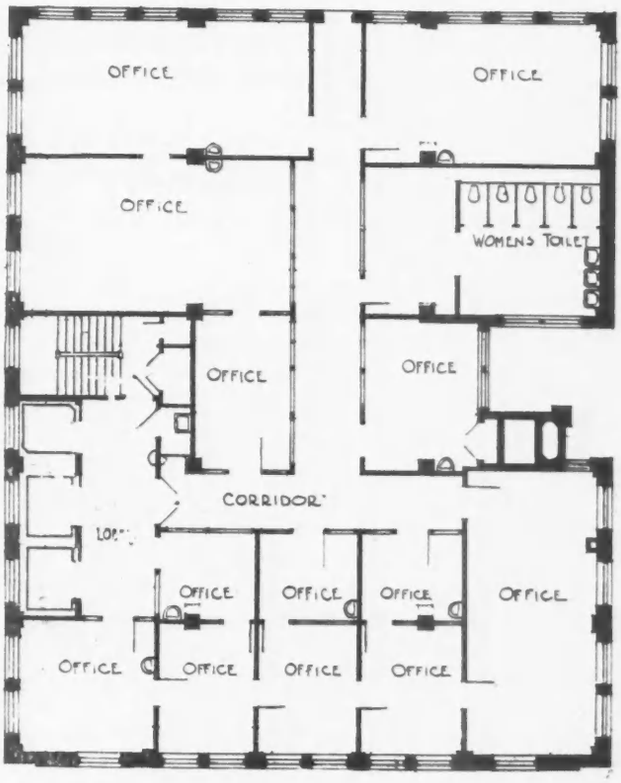
The unusual requirements that the owner remain on the premises prolonged the period of construction, but provided many interesting engineering problems.



SECOND FLOOR PLAN



BASEMENT PLAN



TYPICAL FLOOR PLAN

A Study of These Plans Shows an Exceedingly Efficient Arrangement of the Banking Quarters and Well Lighted Office Space for Rent on the Floors Above.

Octagonal Bank Design of Fine Lines and Decoration

Marshall and Fox, Architects

THE Sheridan Trust and Savings Bank Building, situated in the rapidly growing Uptown District of Chicago, is built in the Italian Renaissance style. Its outer walls are of cream colored terra cotta contrasted with green terra cotta window spandrels and architectural decoration around all first story openings.

The present building is eight stories in height, so designed by the architects, Marshall & Fox, that four additional stories may be added without inconvenience to the present tenants.

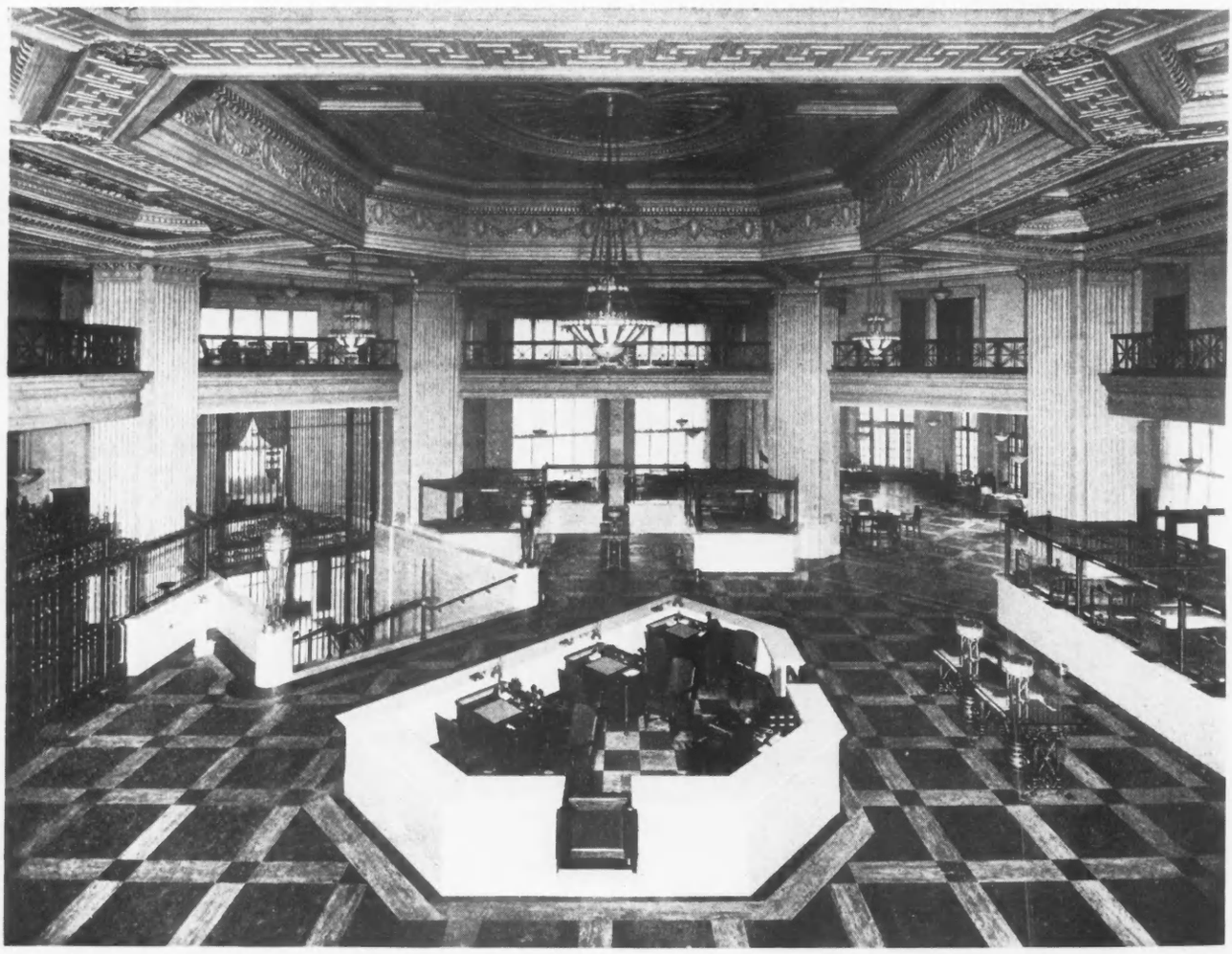
The shape of the lot presented many difficulties in planning. An examination of the plans will illustrate this and how well it was accomplished. The ground floor is devoted to shops and savings bank with broad corridors connecting with elevator lobby, safety deposit and bank entrances.

The bank, occupying the main floor and mezzanine floor, is entered through beautiful wrought iron gates by ascending a broad stairway of tavernelle marble. This stairway terminates in the central space of the bank, octagonal in shape. 82 feet wide and 30 feet high, nearly surrounded by columns and bank cages of travernelle marble, glass and wrought iron, and having in the center an island surrounded by marble counters where some of the bank officers deal with the public. The coffered ceiling of the bank is decorated in pleasing tones of blue and gold and from it are suspended huge chandeliers of chased bronze.

From the central octagon, open the elevator lobby, the real estate department, and a large room occupied by the officers of the bank, and from this space the officers may ascend by means of a private elevator to the mezzanine floor occupied by clerical force and their locker rooms, also an oval directors' room paneled in American walnut and the president's private office similarly paneled and lighted with indirect cove lighting.

The entire bank and mezzanine floor and corridors in the office floors are covered with rubber flooring which makes for quietness throughout.

The savings bank on the ground floor is also finished in marble with glass and wrought iron counter screen. All writing desks are made of the same material. Another private elevator connects the mezzanine floor, bank floor and savings bank with the safety deposit and bank vaults in the basement. Special stairways give access from one part of the banking space to another without leaving the banking quarters of the building. In one space, a second stair placed in the same stair well but having no connection with the bank stairway, furnishes egress from the fourth to ground floor.



The Octagonal Banking Room in the Sheridan Trust and Savings Bank Is Well Designed and Beautifully Decorated. The rubber tile flooring greatly enhances the beauty of the interior.

The four stories above the bank are divided into offices, photograph studio, etc.

Special arrangements in plumbing and electric wiring were made for dentists and physicians who have taken possession of all offices on the north side of building.

The basement of the building is occupied by the safety deposit vault for the public, with coupon booths and conference rooms for their convenience; also the heating and power plant.

The construction of the building is steel frame with reinforced concrete floors. There are three high-speed electric elevators serving the upper floors and a shaft provided for a fourth elevator which will be required when the four additional stories are added.

A bank has certain requirements not met with in other types of buildings, particularly in the matter of signal and wiring devices. This bank is so arranged that notice of an attempted holdup would at once be signalled to all parts of the bank, police on duty outside, and the police station. By means of special wiring and devices, these same signals would automatically be set off if any of the wires were cut or the safe drilled.

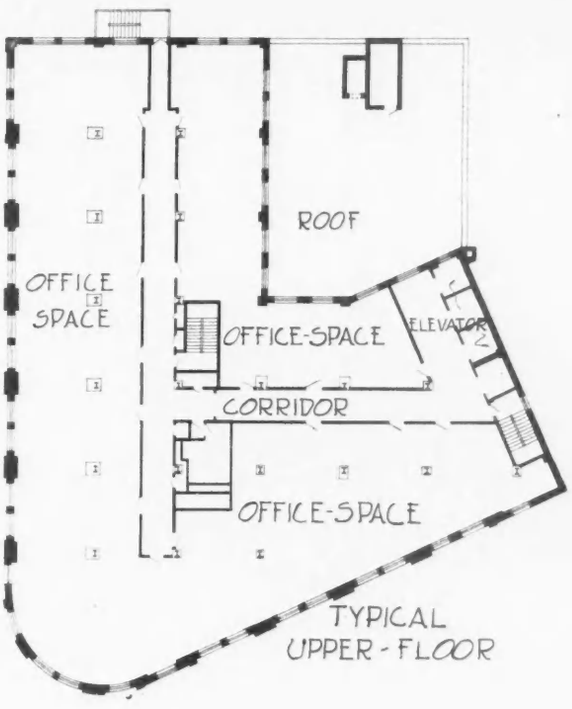
A system of clocks and time stamps is provided throughout with a beautiful master clock in the safety deposit lobby. The bank is also provided with its own system of automatic intercommunicating telephones. In addition to this the building must have its own heating plant, automatic fire pump, water pumping system, compressed air system for the dentists, a compressed air sewerage ejector and a large switchboard which controls the lights and power throughout the building.

When one realizes that the gold in an old rug on the floor of a dentist's office will be sufficient to buy a fine new rug, it may be interesting to know that all waste pipes from dentist lavatories are run through a catch basin where much gold may be salvaged.

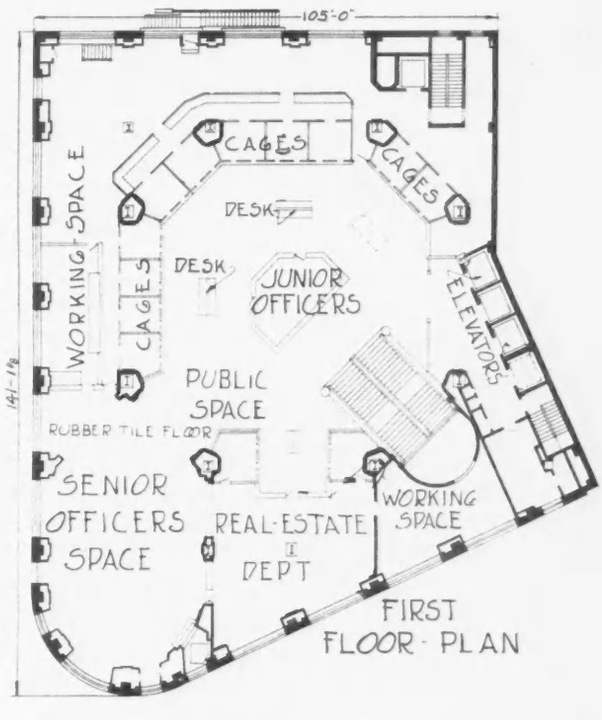
In this building there are also five ventilating units handling a total of 100,000 cubic feet of air per minute, tempered and discharged into the various spaces through grilles at such low velocities that no one is conscious of a draught and the air is always fresh.



Exterior View of the Sheridan Trust and Savings Bank, Chicago. There are four floors devoted to banking purposes and four floors of rentable office space above.



It Will Be Noticed That a Light Court Cuts Into One Corner of the Building in the Five Upper Floors so That All Offices on These Floors Have Good Daylight.



This Is an Exceedingly Convenient and Well Arranged Banking Room, with an Island in the Center Where Bank Officers Are Accessible to Incoming Customers as They Emerge from the Stairway.

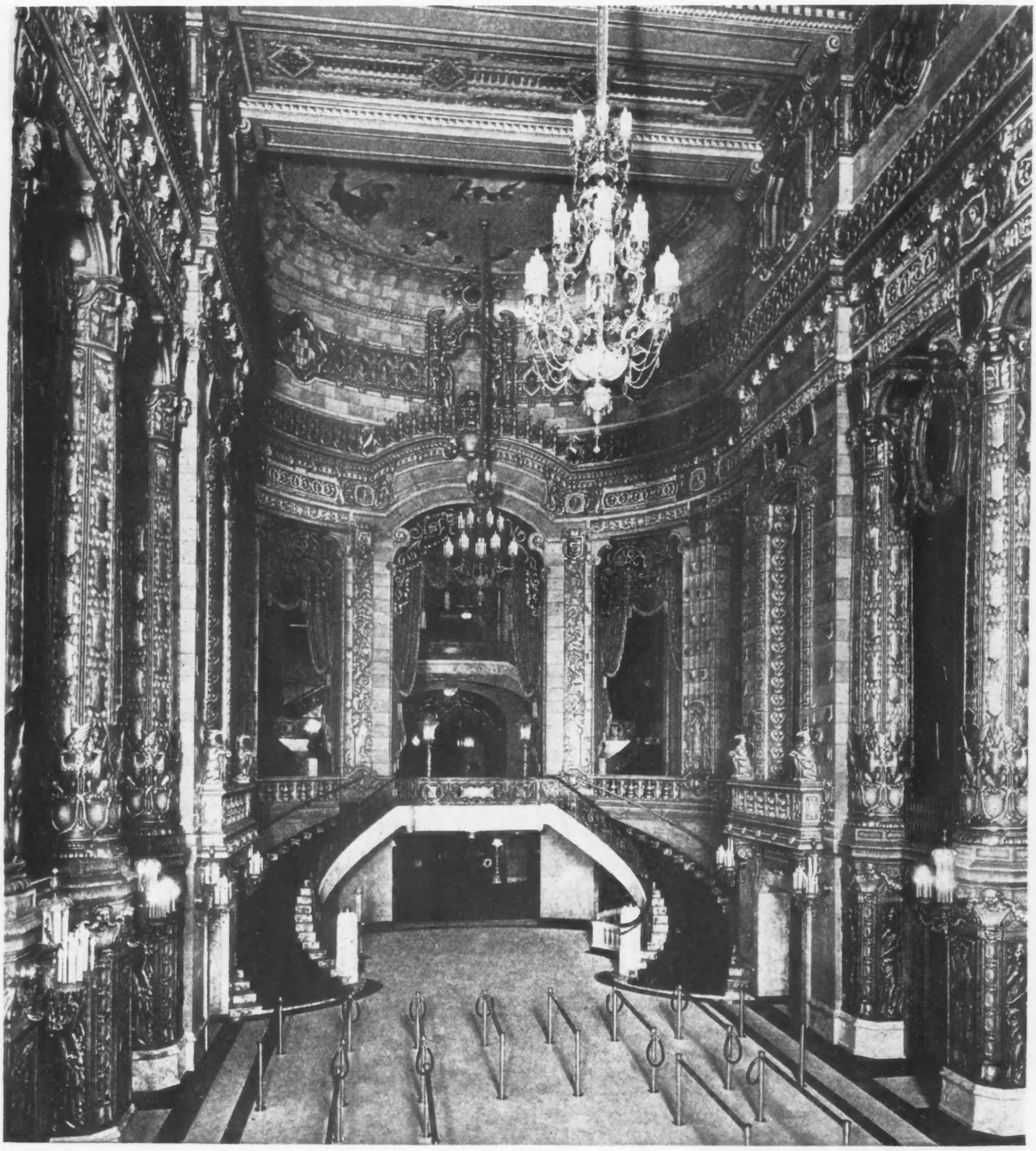
A Magnificent Theater

The Uptown Theater, Chicago, Is a Marvel of Decorative Luxury

C. W. and GEO. L. RAPP, Architects

GORGEOUS color and elaborate decoration greet visitors to Chicago's new Uptown Theater, which covers a site of one and one-quarter acres—said to be the largest in the world. Color plates 8 and 9 following page 250 show the Uptown Theater in its true color values.

The interior decoration of the auditorium follows the style of the Spanish Renaissance. In the main lobby, the prevailing tone is that of gold bronze, with touches of ultramarine blue on the shields that are a decorative feature of the immense Corinthian columns which rise the full six-story height of the main lobby. The dark red carpeting of the horse-shoe stairway in this lobby adds a vivid color contrast, while, overhead, a mural painting of figures in the blue sky adds the crowning touch.



The Main Lobby of the Uptown Theater, Chicago; Spectators Buy Their Tickets at the Entrance and Immediately Enter These Scenes of Gorgeous Splendor Which Whets Anticipation for the Entertainment to Follow.

Griffins, medallions, arabesques, arcades, sculptured figures and other ornamental features mark both lobby and foyer, while gleaming chandeliers in bronze and crystal light the scene. In each of these large chandeliers there are 212 lights. The floors and baseboards are of Tennessee marble with borders of green Vermont marble and there are black Belgian stone trimmings in a number of places.

Along the mezzanine, on each side of the lobby, are beautifully furnished and lighted art galleries, consisting of oil paintings selected and hung by Frank Cambria, art director for Balaban and Katz, the owners.

One of the color plates in this issue shows the interior of the auditorium, with its general tone of gold bronze and red. There is a play of colored light in the auditorium which change from rose to moon-green and other tints, transforming the beautifully decorated auditorium into fairyland.

Paschen Brothers were the general contractors for this large theater and the H. A. Cousins Company executed the ornamental plastering work. Some of the plaster pieces cast weighed over two tons.

Enormous quantities of building material were necessary in the construction work. Among the more notable items were 12,000 tons of cement plaster, 36,000 yards of expanded metal lath, 300,000 feet of channel iron and 9,000 pounds of tie wire. There are eight separate ventilating systems used in the theater, supplying 300,000 cubic feet of fresh air per minute.





A View of the Foyer in the Uptown Theater. The doors at the left lead directly into the auditorium. The view at the left shows a view of the foyer which runs at right angles to the main lobby towards the exits on Lawrence Avenue. Rich decoration continues throughout these passages.

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Save the Surface Museum Being Established in China

THE National Institute of Technology in Pekin, China, is organizing a Save the Surface Museum under the supervision of Prof. Z. C. Dage. American manufacturers who have or desire business in the Orient should communicate with Prof. Dage. The museum is open to the public and is ready to recommend to the trade any worthy equipment, material and manufactured products.

A Revolutionary Idea In Theater Design

Provides for Theater-Goers the Refreshing Scenic Atmosphere of Out-of Doors in Place of Overdone Interior Decoration

By JOHN EBERSON, Architect

THE opening performance in one of our gorgeous picture palaces of gold, glitter, silk and satin, rich ornament and glaring decorations is truly an inspiring sight, but it has been my observation that the rapture of the audience is not particularly lasting. Surroundings soon become something akin to oppressive and embarrassing to the steady patron.

With an appreciation of these facts in mind, the "atmospheric" type theatre suggested itself to me. I visualized a magnificent amphitheatre set in an Indian garden; in a Persian court; in a Spanish patio, nestling under a soft moonlit sky. I borrowed from classic, ancient and definitely established architecture the shape, form and order of houses, gardens, logias with which to convert the theatre auditorium into nature's setting.

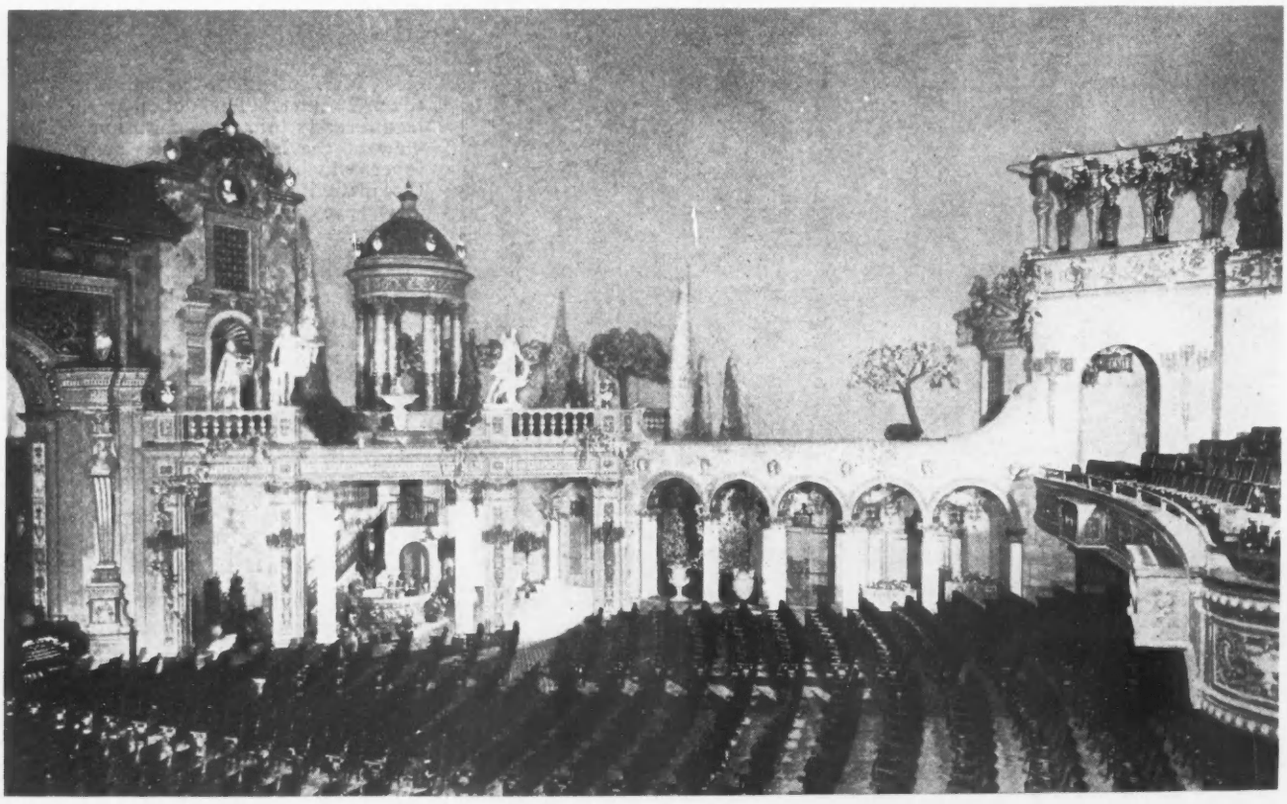
It became necessary to study with utmost care the art of reproducing ancient buildings in form, texture and color, tree ornament, furnishings, lights and shadows to produce a true atmosphere of the outdoor without cheapening the attempted illusion by overdone trickery.



John Eberson, Architect, of Chicago, Who Introduced the "Atmospheric" Theater, Was Born Abroad, but Is an American of Thirty Years' Standing. He has branch offices in Houston and Miami.

The auditorium thus created seemed to please. Despite its vastness and expanse, it offered at atmosphere of intimacy—a highly desirable feature of theatres. And, most important of all, the atmosphere is always new, fresh and alive. These ideas were worked out, for the first time in the Capitol Theatre, Chicago.

The auditorium of the Capitol might briefly be stated to represent an Italian garden under Mediterranean sky, featuring a moonlight night. On the left side of the auditorium is an Italian palace facade with grilled roof shelter on top. The right side of the auditorium represents a terraced roof garden with a small temple building. Surmounting the whole is a deep blue sky with moving clouds and small twinkling



A View from the Balcony of the Capitol Theater, Chicago, Showing the Outdoor Effect with a Garden Scene and Temple in the Background and Twinkling Stars Overhead. The illusion of being outdoors is said to be almost perfect.

stars, creating a complete outdoor setting.

How much more permanently pleasing is this than the customary elaborate motion picture theater. We are tired of the overworked styles—the French Baroque; the Colonial expressed in Adam period style; and the Greek or Pompeian styles of architecture. These, serving the standards, have created hundreds of playhouses of tiring similarity. Stock patterned lines, groaning under the necessity of establishing individuality for the particular theater have necessitated lavish expenditure to accentuate them. Yesterday's theater is old fashioned today and today's theater has been virtually a replica of yesterday's except that it has been "dressed up" a little differently.

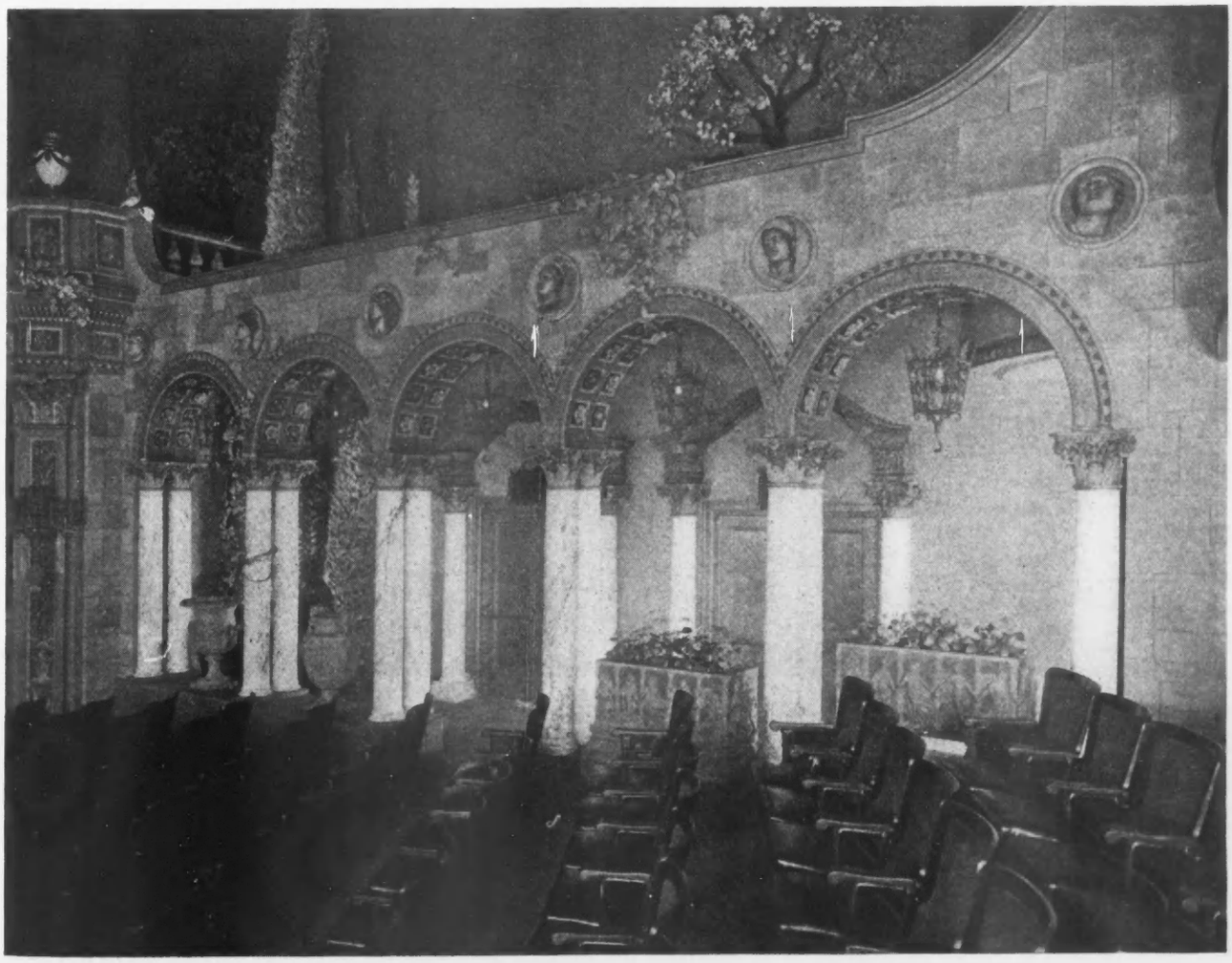
In this out-of-doors or garden style on the other hand we have something entirely different.

The installation of a very elaborate and special lighting system made it possible to add to the illusion of deep blue sky, the glowing firebrands and urns resting on doorheads, wall copings, balustrades; the slow moving clouds; the stereopticon effect moon rise; the twinkling stars; the sunset effect up over the terrace garden; the warm glow coming from the interior of garden houses, palace interiors and the temple.

The cupola of the temple and its treatment were modeled after the many examples of architecture found in Milan, Pavia, and some other Italian cities. The openings to the boxes representing entrances through the palace garden walls are Ponsello arches and the doorheads of the stone gateways through the garden walls which form the side of the auditorium, both in the balcony and on the lower floor, have cornice and pilaster treatment similar to those found in the palace of Gambaro at Genoa.



A Niche in the Upper Garden Wall. The blue sky illusion commences as a background for this wall which shields the spectator from too close a view.



Close-Up View of the Garden Wall in the Capitol Theater Showing the Arches, Trees, Flowers and Shrubbery. The decorative lanterns send their glow above the line of the wall on the inside.



Stage Fountain and Proscenium, Left, in the Capitol Theater, Chicago; John Eberson, Architect. Actual cascades of water sparkle from this fountain. Beyond the proscenium arch, as a background for the fountain, is a garden scene of great beauty.

The pilaster ornament of the great columns, and pilasters supporting the triumphal arch, are exact reproductions of carvings of a collection of reproduced pilasters of the Academy of Fine Arts in Verona.

The door friezes of main auditorium represent a double gallery and promenade, separated from the auditorium by rich archways carried on marble columns; thus extreme depth and distance is added to the huge interior, and in doing so every aisle and seating requirement ordained by the law has not only been followed but the spaces usually allotted for aisles and cross aisles have almost been doubled in size.

The main lounge and grand staircase hall is four stories high, representing an Italian patio with clear sky overhead and rich palatial garden walls enhanced with carved niches and statuary. The promenade back of the amphitheatre is a replica of a stuccoed cloister arcade, embellished with wrought iron gates, lanterns and distance mirrors.

Loyal Order of Moose Builds Club House with Stores

Robert S. Harsh and Associates, Architects and Engineers, Columbus, Ohio

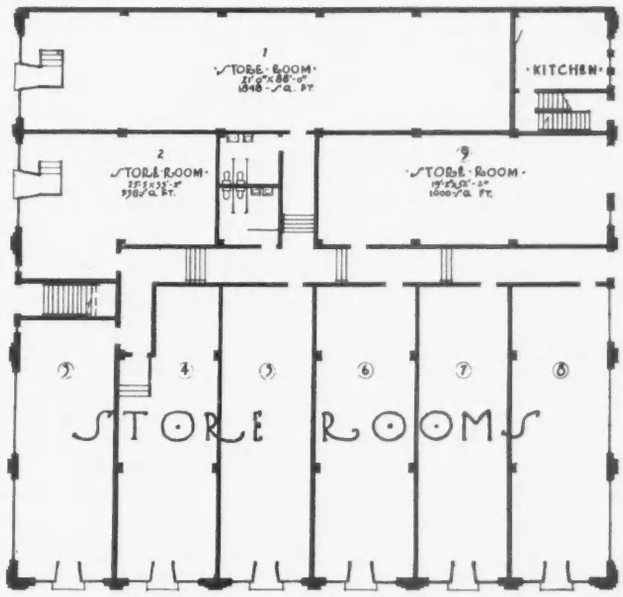
THIS excellent plan shows rentable floor space in stores and offices which should yield a profitable revenue to Alliance Lodge No. 362 of the Loyal Order of Moose, besides providing commodious lodge rooms and comfortable parlors for their own lodge use.

The building is of wall bearing construction on the two streets and on the alley side. The interior and the fourth side is carried on structural steel columns, girders and beams. Steel joists are being used, with 2 inches of concrete over the top. All floors to have cement finish on the structural slab. The walls are of red brick with red mortar joints and trimmed with buff Indiana limestone. The roof is constructed so that it may be fitted up as a roof garden.

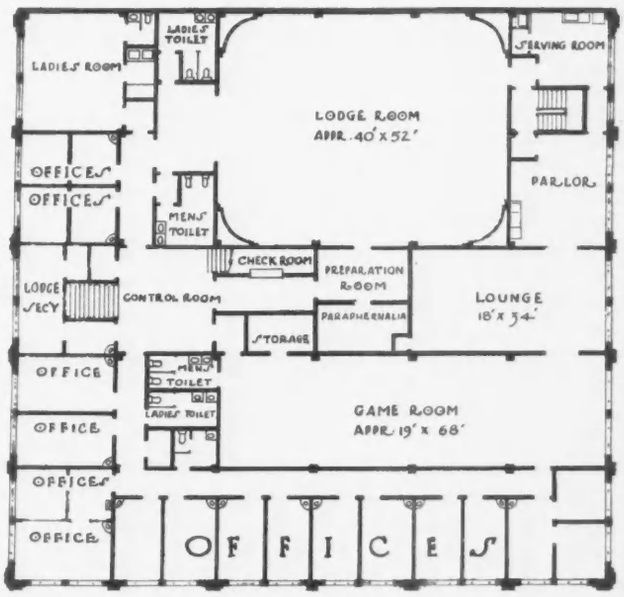
The boiler room is located under the rear part of store No.1 and it will be noticed, by reference to the floor plans, that this kitchen is connected by a stairway with the lodge serving room above. Suppers and refreshments are often served in lodge rooms after lodge meetings or when dances are scheduled in the lodge room.

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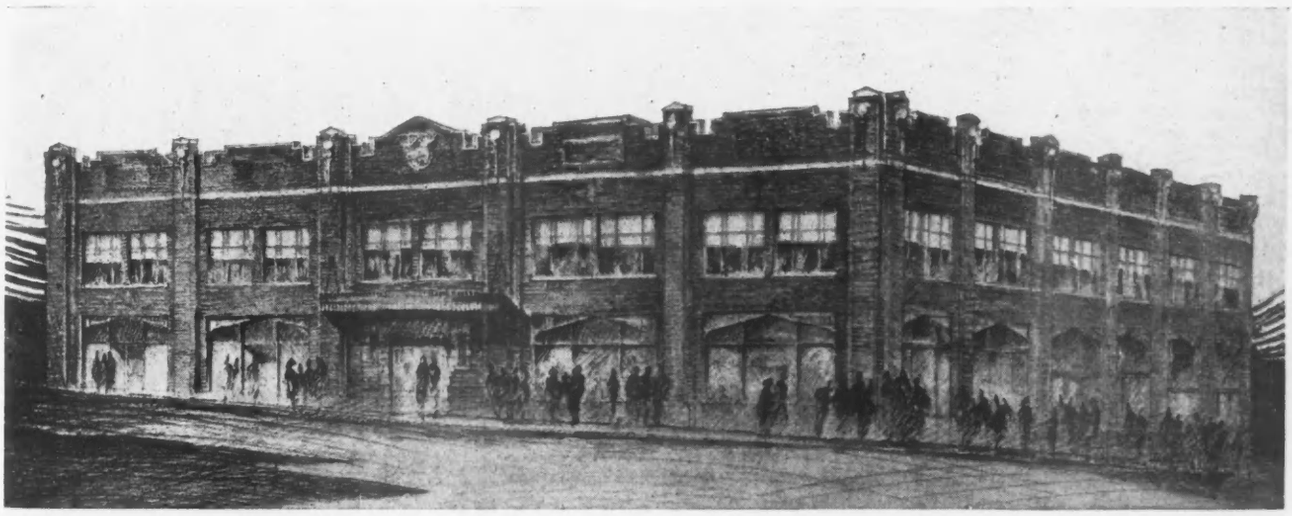
"AN appreciation of good architecture in small house building is necessary for the development of congenial American community life. Community spirit, manifesting itself in the desire for home ownership, has been more effective than any law could be in bringing about a demand for good architecture."



This Building Has the Commercial Advantage of Being Located on Two Streets and an Alley, Allowing a Great Deal of Store Frontage. This plan of the first floor shows nine store rooms.



This Plan of the Second Floor Shows, Besides a Good Sized Lodge Room and Parlors, a Game Room and Lounge and a Number of Office Suites Which Should Help to Provide a Revenue from the Building.



Lodge and Commercial Building of Lodge No. 362 of the Loyal Order of Moose, Alliance, Ohio. Robert S. Harsh and Associates, Inc., Columbus, Ohio, Architects and Engineers.

A Small Store Building With Good Lines

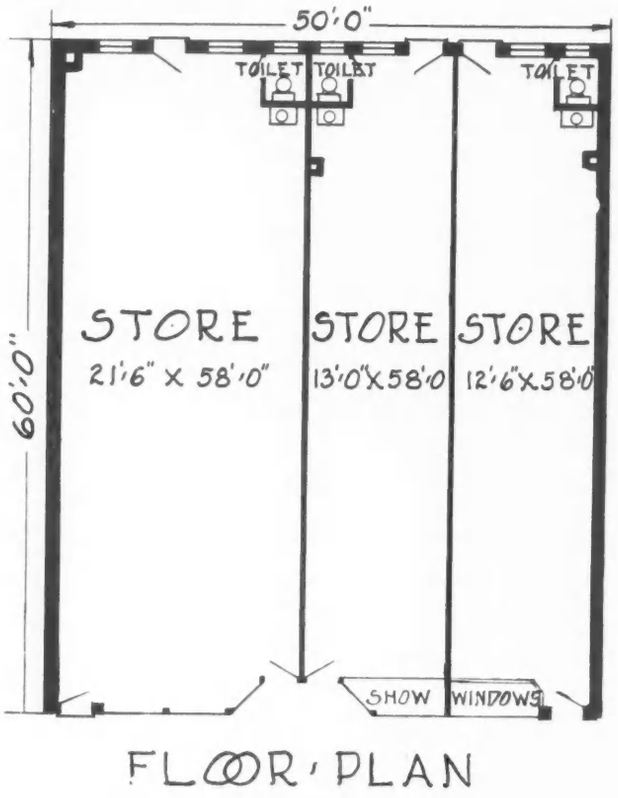
THERE is no reason why a small building should not have as good lines proportionately as a large one and it is encouraging to find an increasing number of well designed small store buildings. The one shown herewith probably cost very little, if anything, more to construct than the usual box with windows.

There is a touch of the Elizabethan period in the half-timbered steep pitched gable end; in fact, the gable roof itself is a relief from the seemingly endless succession of flat roofs so often seen in business districts. A little architectural tile has been used in the bay which marks the largest store front and the ends of the brick side walls are set back along the angle of the roof pitch with coping caps of white stone, which adds an effect of trim and finish.

The plan shows one medium size and two small store spaces. While the floor plan does not indicate such structural details, piers will probably be necessary in the brick walls to carry roof trusses for the 50 foot span.

The building is simple and inexpensive to construct. Even a rental revenue of $100.00 per month—and it would undoubtedly be greater than this in most localities—would be 6 per cent on an investment of $20,000 which would more than cover the cost of this little building.

These stores and, in fact, many small stores, can be effectively heated by small hot water heaters on the same floor or by cabinet warm air heaters. Thus, with the rear portion of each store partitioned off as a stock room, no basement is required, which effects a considerable reduction in the first cost of the building.



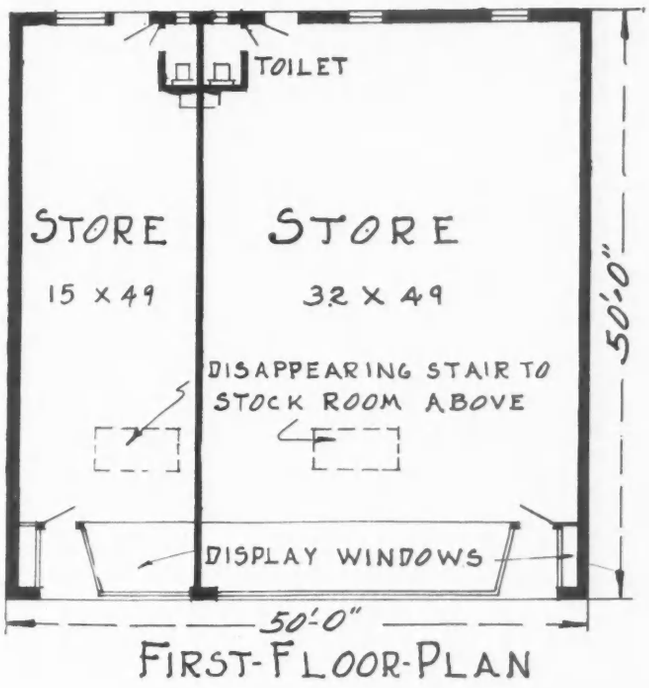
FLOOR PLAN



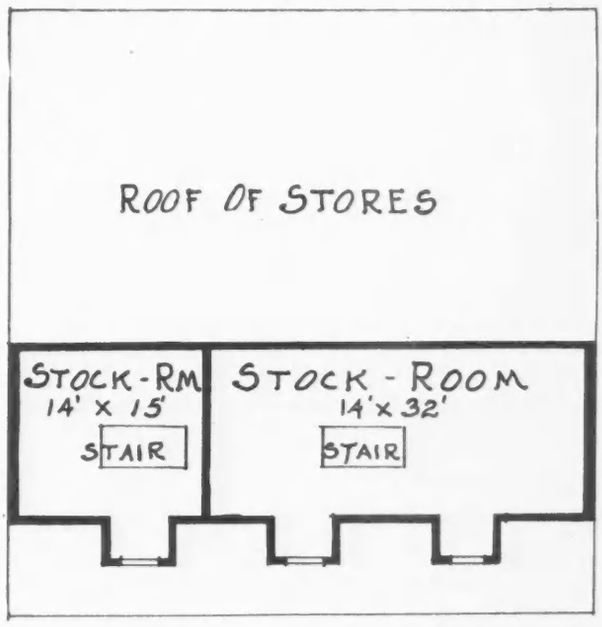
Small Store Buildings of This Type Usually Require No Basements and Small Cabinet or Hot Water Heaters in Each Store Will Supply Adequate and Economical Heating.

A Small Store Building of Character

Designed for a Square Fifty Foot Lot



FIRST-FLOOR-PLAN



SECOND-FLOOR-PLAN



This Lot Being but Fifty Feet in Depth, Small Stock Rooms Are Provided on the Attic Floor Above. Reference to the plan shows that disappearing stairways conserve profitable space in the stores at a minimum cost.

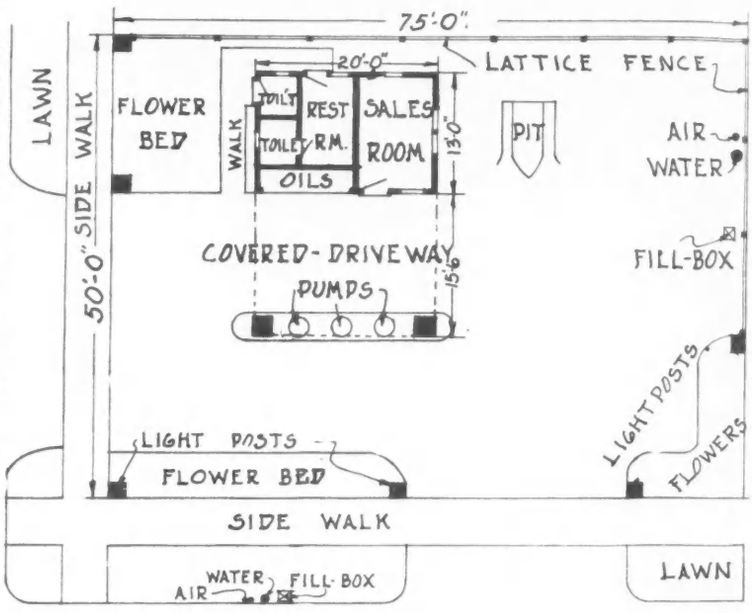
Filling Station of Sheltered Drive Type

A FEATURE of this and many modern filling stations is the ladies' waiting room, so prominently advertised. Motor travel is now so extensive and far reaching that such comforts for travelers are both advisable and necessary. Motorists are quite apt to look for these conveniences when selecting a filling station. Toilets for both men and women are provided in this plan.

Wood frame with stucco exterior and asphalt shingles were selected by this owner for his building and all the driveways are of concrete.

Full advantage is taken of the corner location for ready access from two streets with space for traffic past the pumps in two directions. The covered driveway is attractive to many motorists when the weather is stormy or wet.

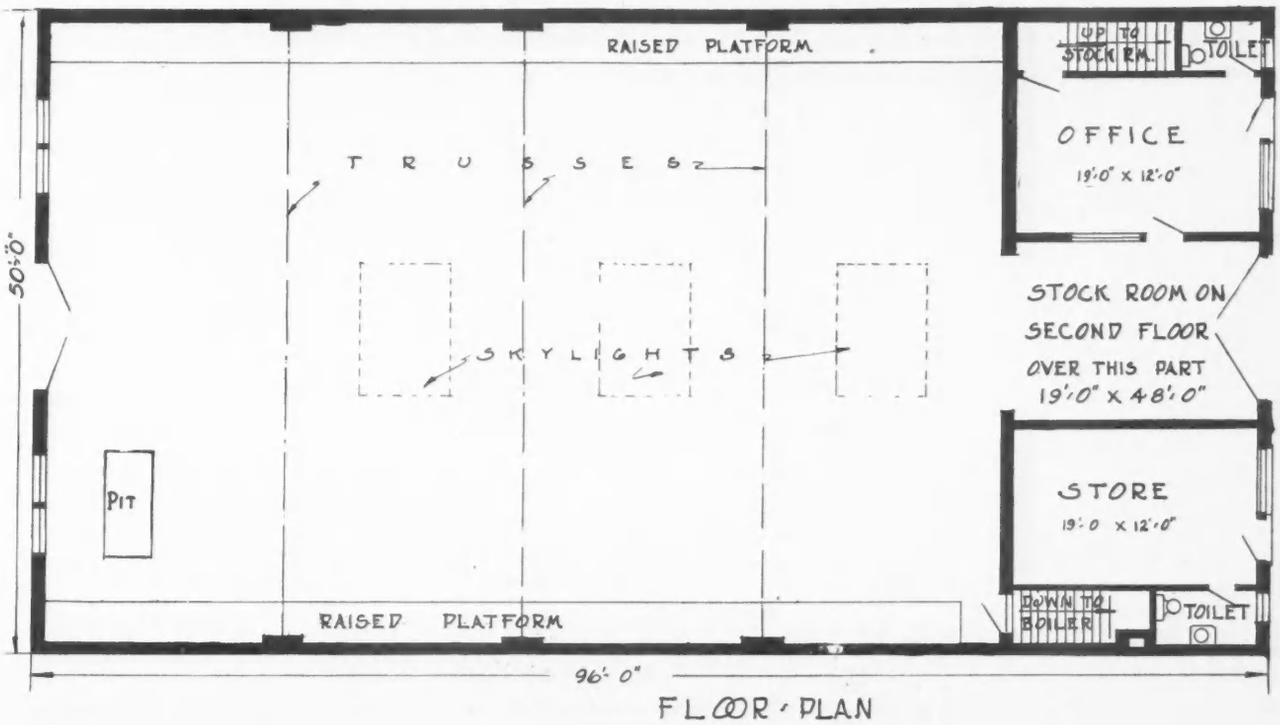
It will be noticed that this filling station is particularly well illuminated—an advisable feature, not only in the evenings but also in the late afternoon hours of winter. Flower beds add to the attractiveness of the site and provision is made for air, water and fill boxes at the curb where there will be no interference with paying business.





This Filling Station, While of Simple Construction, Has Many Desierable Features and Is Attractive in Appearance and Layout. The Approaches and Service Features Are Well Located from an Operating Standpoint.

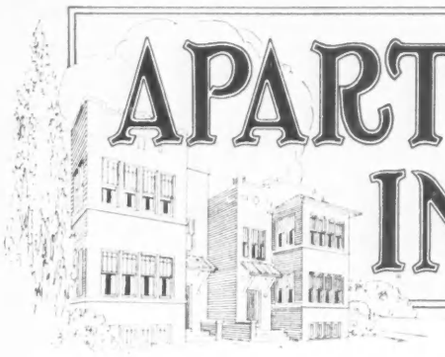
Well Designed One Floor Garage with Store and Office



FLOOR PLAN



This Is a Well Designed Garage Building with Attractive Architectural Features. Piers are introduced in the brick walls to carry the roof trusses and to add stability to the 96-foot long walls. Three skylights light and ventilate the interior.



APARTMENT HOMES IN COLORS

Eight Designs Presented Covering Modern Apartment Buildings from Small to Large

SO many architects and builders are interested in the design, construction and equipment of apartment houses, that this section in duotone with its helpful suggestions and pictorial attractiveness should have unusual interest.

The field is an exceptionally large and important one. In fact, if two-flats be included along with multi-family apartment buildings, this form of dwelling ranks second only to single family dwellings in the number of families housed each year in new buildings. Over a million people will be so housed during the present year, according to forecasts based on actual construction in previous years.

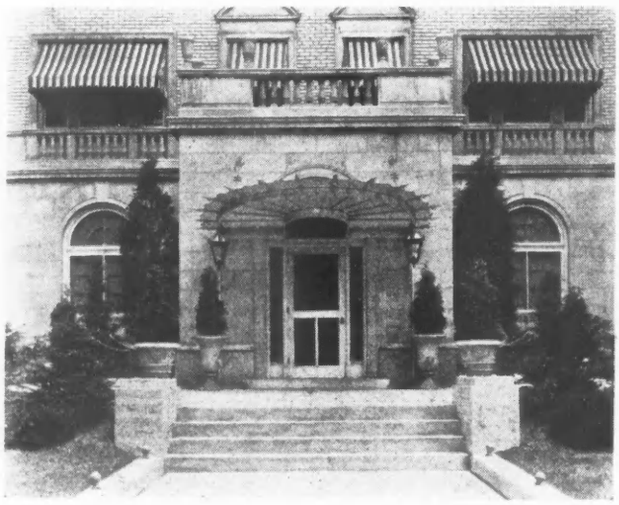
The indications are that new apartment house construction, including two-flats, will reach the impressive money value this year of $1,374,425,000, and will house over a quarter of a million families. These buildings require most careful design and a vast amount of building material and equipment. Designers are sparing no effort to provide the utmost in apartment house comforts and conveniences.

One very striking feature of these buildings, as now designed, is the great prevalence of two, three and four-room suites in the larger apartment buildings. The larger families seem to be mainly housed either in two-flats or single family dwellings. But, even in the two-story apartment houses, there are an astonishing number of four-room, or smaller suites.

According to the last census, the average number to a family in 1920 was 4.9, but the next census is quite likely to show an even smaller family average, if we may judge from the present demand for small suites of apartments. Of course, designers are taking full advantage of the many space saving features now available, such as the disappearing bed and the kitchenette with its convenient cases.

One good feature of modern designs is that the rooms are lighter and airier. If other rooms are smaller, at least, living rooms are larger than formerly. A successful apartment house designer must be able to reduce waste floor space in halls and stairways to its irreducible minimum. He must, further, arrange his orientation to get the utmost obtainable in light and air. This is not so difficult in the higher priced projects where good orientation, with cheerful daylight in each room and cross ventilation through each apartment, obtain recognition in the form of higher rentals.

It would not be at all surprising to see the casement window idea spread to apartment house specification, so as to give tenants the advantage of full opening sash during warm weather. A constant effort is being made in most American cities to reduce the smoke nuisance, so there will be an increasing tendency towards more full opening windows. Around our larger metropolitan cities, however, apartment house dwellers are invading the nearer suburbs in search of purer air and more beautiful surroundings without giving up the apartment house form of living which has so many conveniences and so few responsibilities. We show one such apartment building in Plate 2. This is an unusually good design by Architects Butler and Prevoost.



Imposing Entrances of Fine Design Are Often Features of Better Class Apartment Buildings, as Is the Entrance Shown Above. Our photograph was taken in Pittsburgh.

It is rather difficult to classify apartment hotels either as hotels or apartment buildings, for they have features incidental to both. Most of them are completely furnished, whereas apartment buildings are not. More help is maintained and more service given than in apartment houses. This service is usually confined to hall service and room service must be paid for extra. It is not surprising that so many of these apartment hotels have kitchenette apartments, the kitchenettes used mainly at breakfast time, before the occupants are ready to go out to a cafe. These kitchenettes, of course, must have sinks, gas ranges, refrigerators and kitchen cabinets and frequently these apartments have more than one bath room.

Disappearing beds are in demand both in apartment buildings and apartment hotels, and constitute a notable space saving feature.

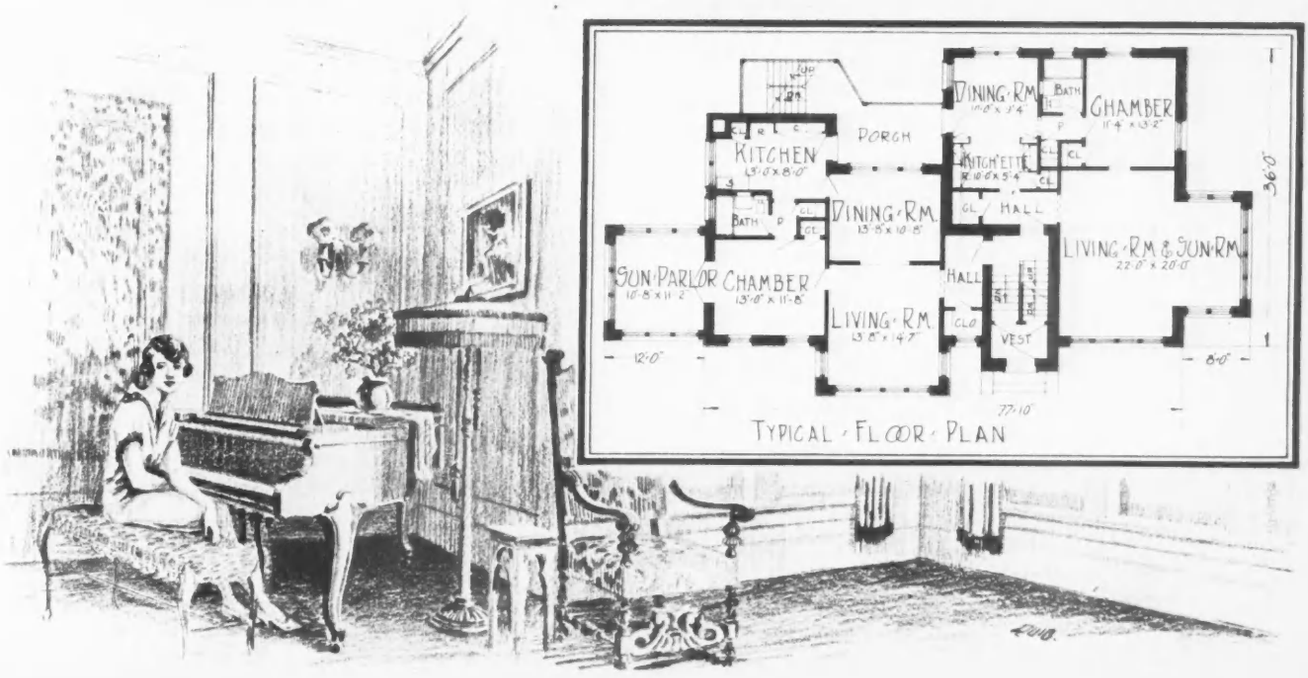
The more pretentious apartment buildings and apartment hotels are provided with many attractive community features, such as a spacious and beautiful lobby or lounge, a ball room, a children's play room, a solarium, and sometimes a billiard and smoking room or a bowling alley. They practically all have the best heating equipment obtainabe, as well as hot water heaters, mechanical refrigeration and garbage incinerators. Elevator service is an essential feature of such buildings.

A Four-Apartment Two-Story Building with English Basement

JOHN HOCKE, of Chicago, *Architect*



Here is a high-grade, side entrance apartment building for a 50-foot lot, with two four-room apartments on each floor. All rooms are exceptionally well lighted. The heating plant is placed at the rear of the basement space, leaving the front apartment for very desirable living quarters.



MAPLE COURT APARTMENTS

GLENBROOK, CONN.

BUTLER & PREVOOST, of Stamford, Conn., *Architects*



An interesting apartment building for a corner site. English half timber design. The architects have worked in nine apartments on each floor; every room with full outside light. The planning of the two wings is identical.

In residential suburbs this style is preferred over the regulation straight front, three-story apartment or flat building.

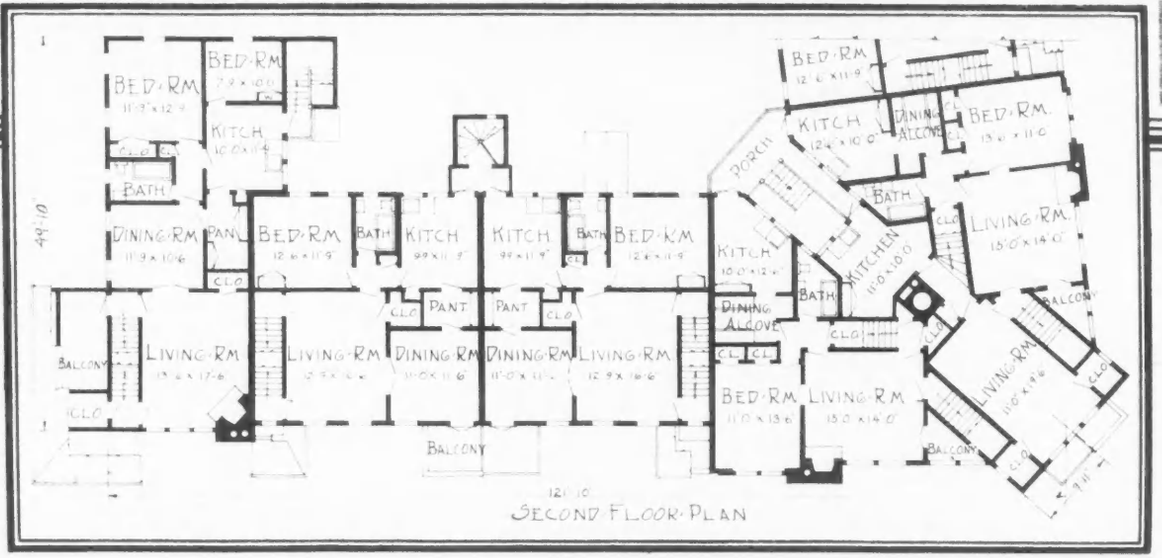


PLATE 2

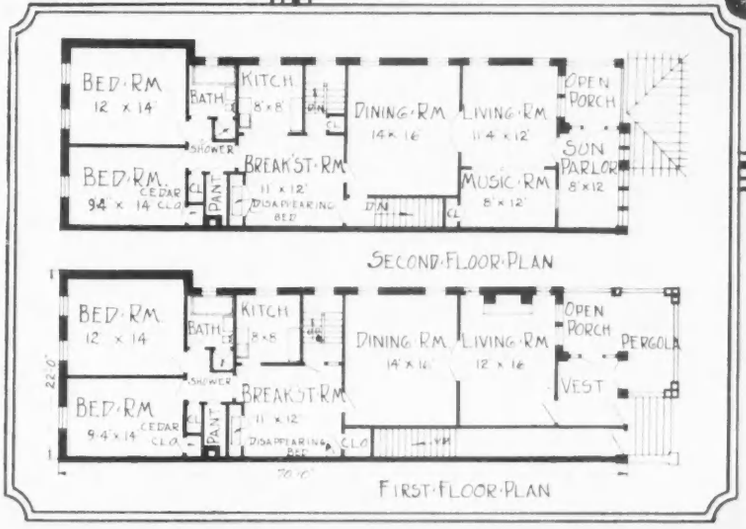
The New York Type Duplex

Four six-room homes
on 44 feet

SAMUEL LOUIS MALKIND
of Brooklyn, *Architect*







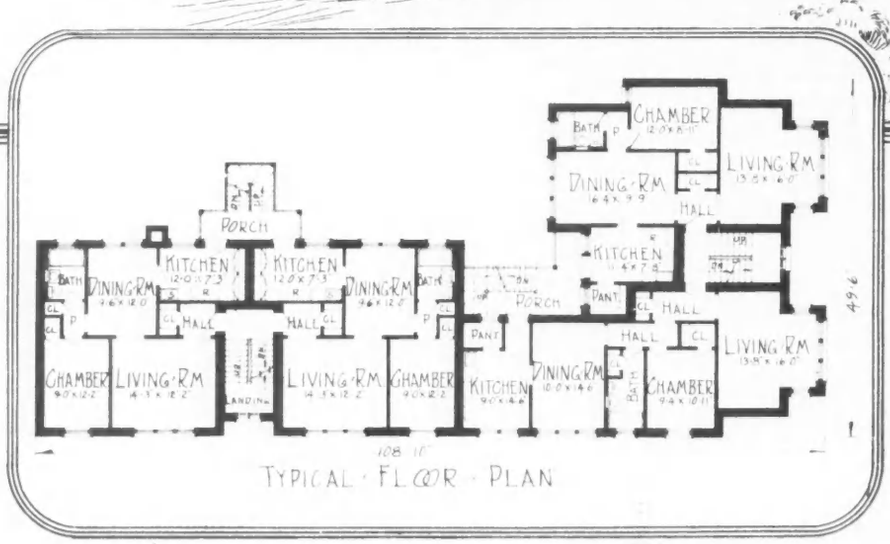
Where land values are high, narrow houses are the rule. Sometimes these houses are built in solid rows; sometimes in groups of four. This design features the glazed and open front porches and gets good light to all rooms.

Eight Four-Room Apartments on Each Floor—Corner Building

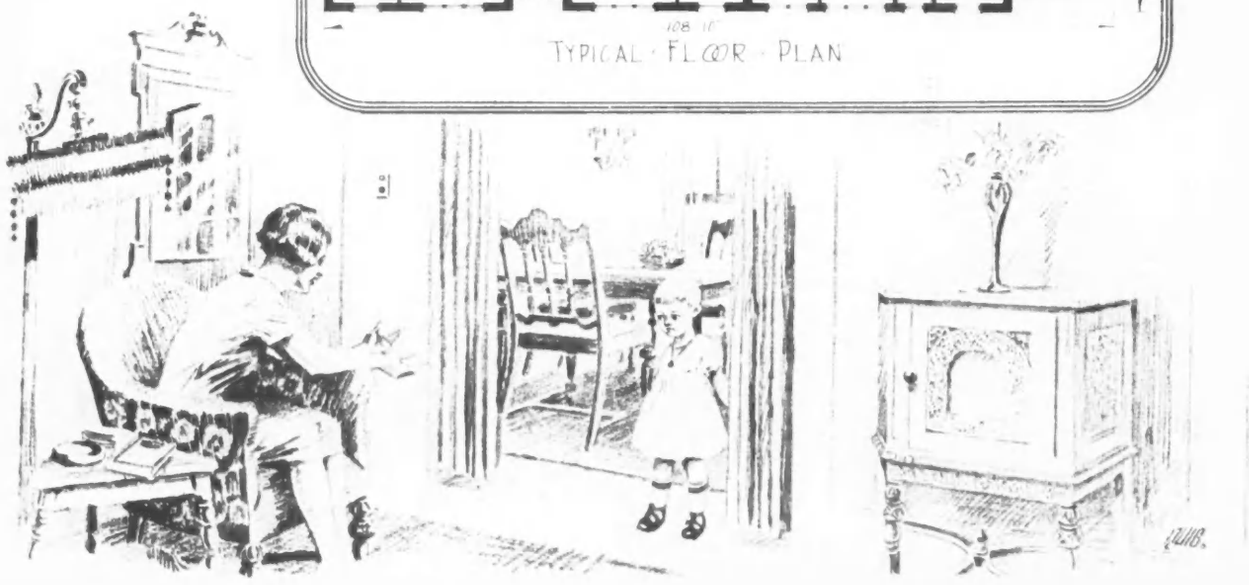
Can be two, three or four stories high

JOHN HOCKE, of Chicago
Architect



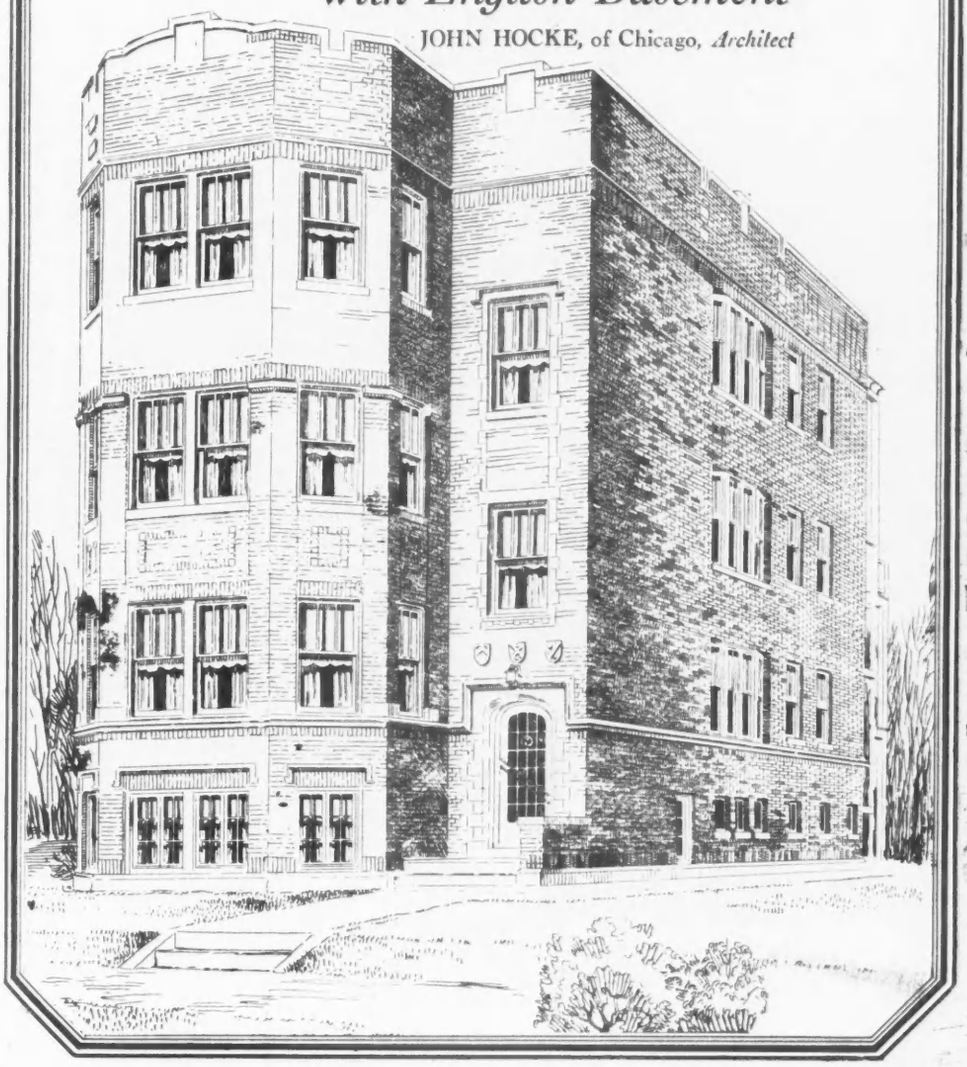


Four rooms is a popular and profitable apartment size and this building has been designed to make the most of a typical corner lot, 50 by 109 feet. Each unit is compact, practically square in outline. All rooms are cheerful and well lighted. The exterior is pleasing without being expensive.



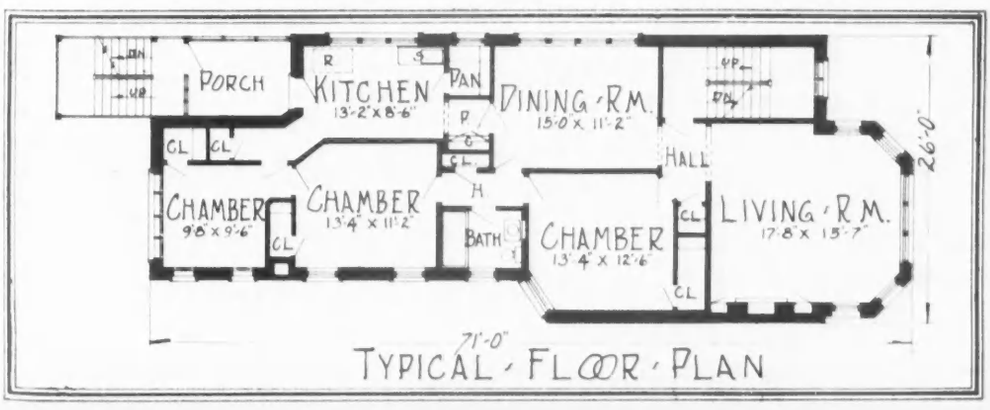
A Detached Three-Flat with English Basement

JOHN HOCKE, of Chicago, *Architect*





Here is an ideal design for a 30-foot lot. The building measures 26 by 71 feet. The left wall being without windows can be put on the lot line, leaving four feet of light on the other side. The floor plan arrangement calls for six rooms and bath on each floor. No space is wasted on halls, yet the rooms communicate in a way that makes this a very convenient plan.

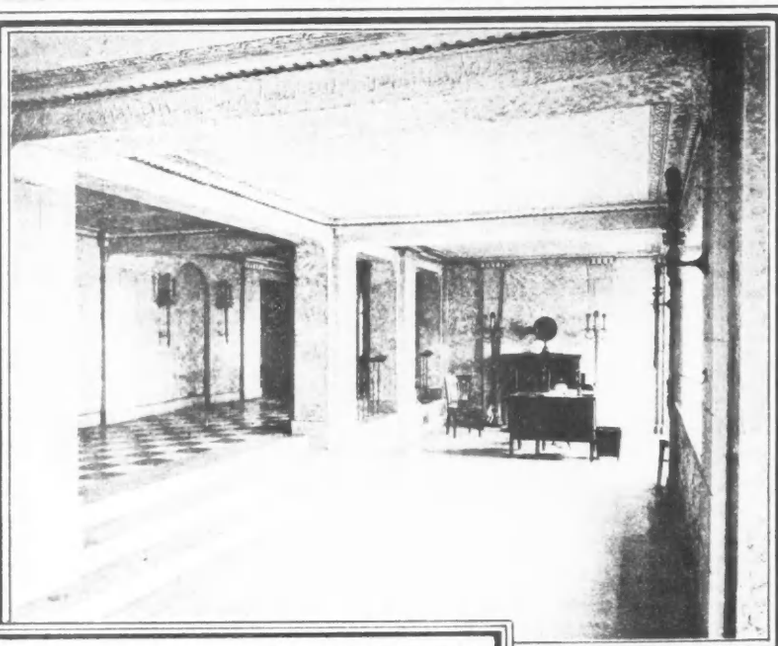


TYPICAL · FLOOR · PLAN

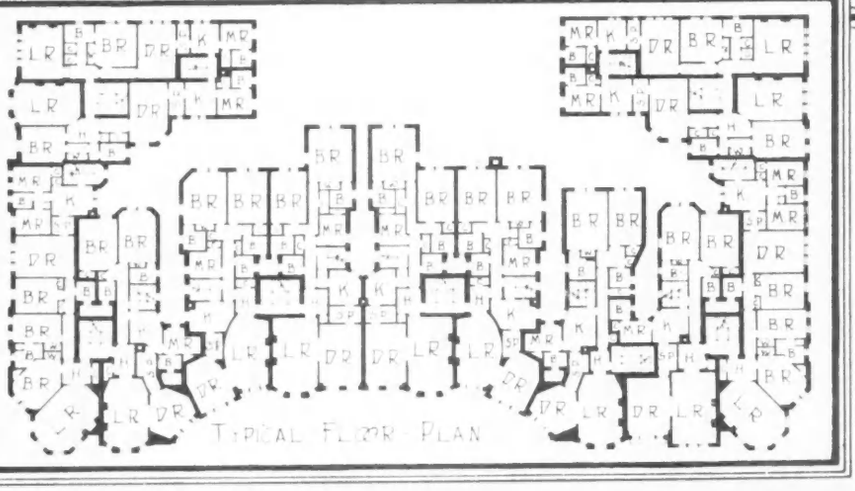
A Large Multiple Apartment Building Three Stories High

ALFRED S. ALSCHULER, Inc., of Chicago, *Architect*



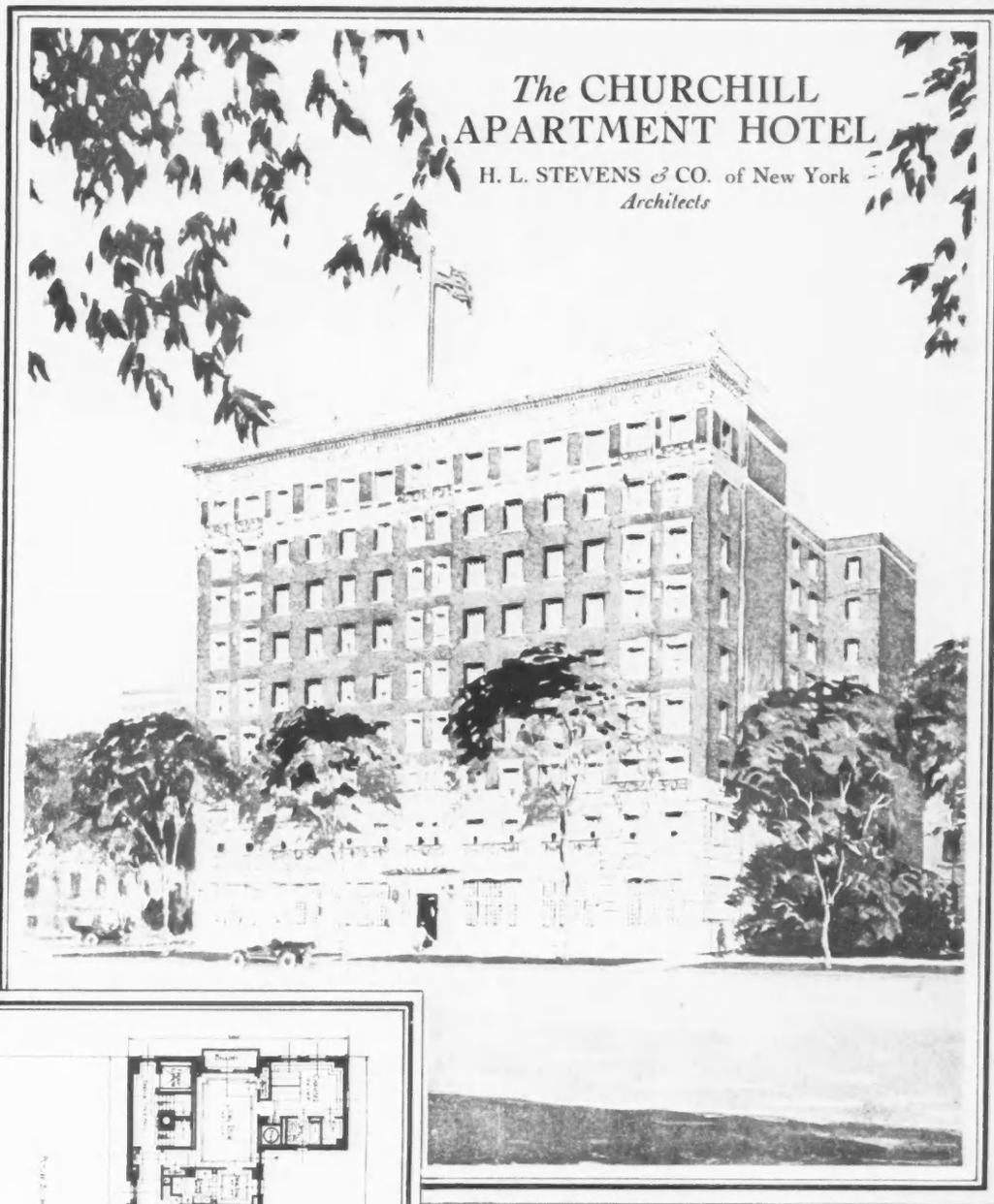


This building contains thirty-nine six and seven-room apartments, besides numerous community or general club house features in the basement. Located in a fashionable residence district these apartments bring a high rental, and the arrangement of rooms as shown in the typical floor plan is considered very satisfactory.



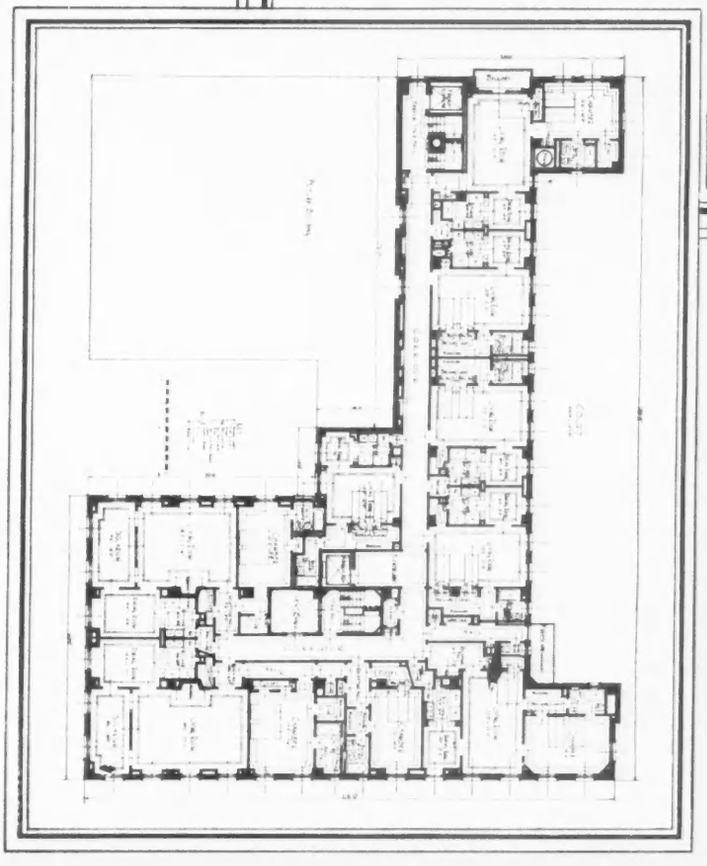


Typical of the high-grade, elevator service apartment hotel, this building is divided into two or three-room units, supplied with all modern conveniences.



The CHURCHILL
APARTMENT HOTEL

H. L. STEVENS & CO. of New York
Architects





WHITTIER APARTMENT HOTEL

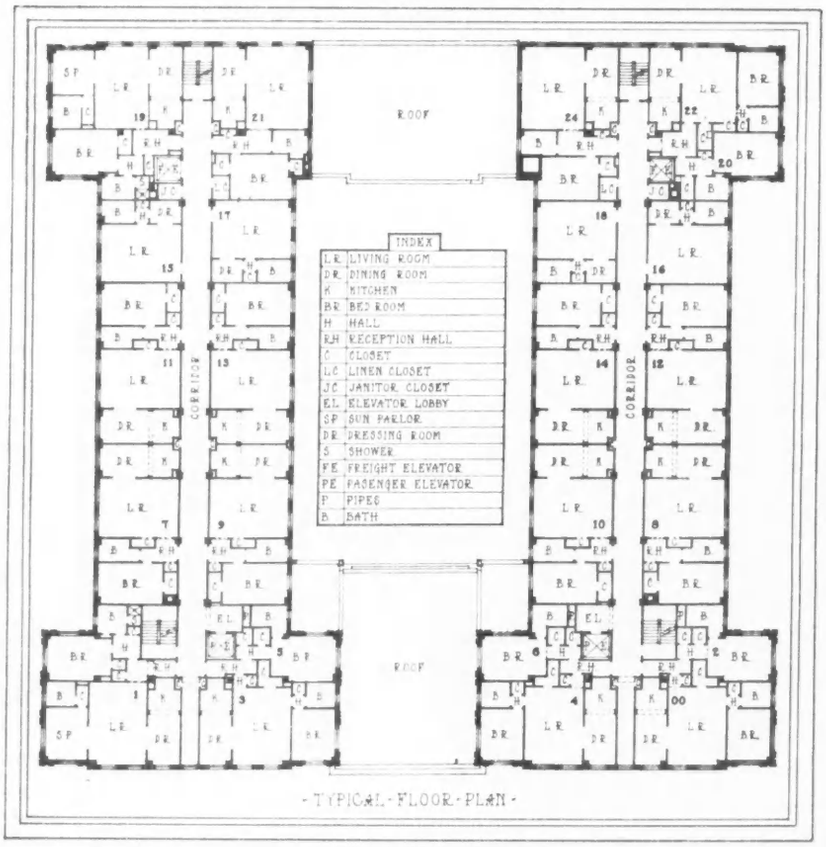
DETROIT, MICHIGAN

CHARLES N. AGREE, of Detroit, *Architect*



A high-grade elevator apartment building of the central corridor type, with efficiency one, two or three-room units.





- TYPICAL - FLOOR - PLAN -

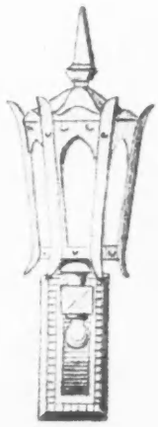


PLATE 8

Space and Labor Saving Equipment in Apartment Buildings

Housekeeping in These Suites Requires a Minimum of Time and Effort

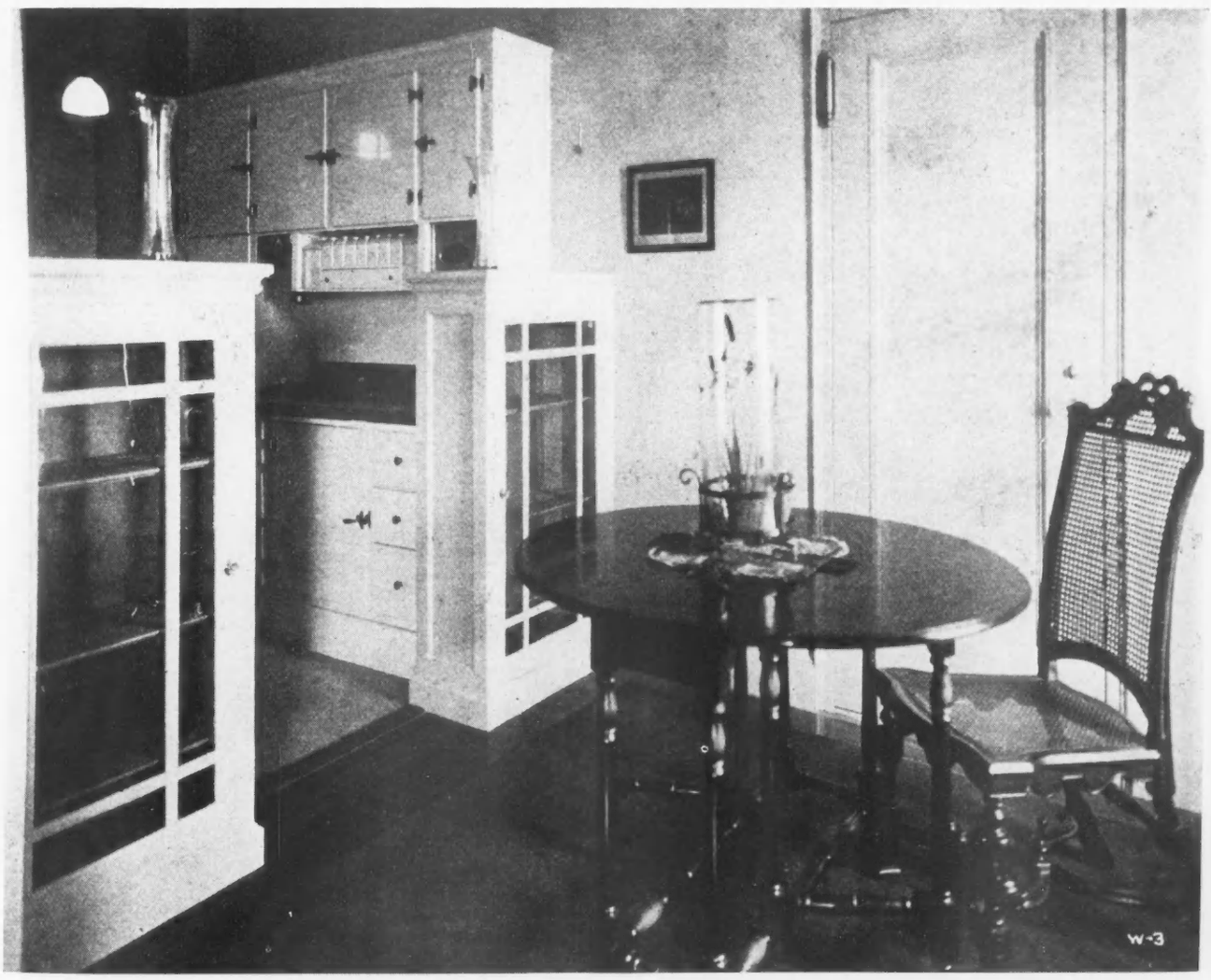
KITCHENETTE apartments are extremely popular in most of the metropolitan cities, particularly in the three, four and five-room sizes. The secret of this popularity may be that, in these apartments, housekeeping seems to be reduced to the absolute minimum. Certainly, every labor-saving and space-saving device for the apartment house dweller are to be found in apartment buildings of the latest type.

Gas ranges, of course, are an essential and, as shown in one of our illustrations, are sometimes set right into the kitchen cases so as to become, as it were, a part of the kitchen cabinet. These kitchen cases and cabinets are an absolute necessity in these kitchenettes and both steel and wood types are in vogue. In most kitchenettes, every available foot of wall space, besides that assigned to the kitchen range and the sink, is devoted to cases and cabinets. This affords extremely convenient storage for utensils and foodstuffs. Such kitchenettes are at all times orderly, for there is literally no room for litter or confusion. All the cases are built in and the housekeeper can reach everything in the place by merely taking a pace or two in either direction.

The latest and best types of enamel sinks and drainboards may be secured in special kitchenette sizes. The very latest idea is a combination dishwasher and sink. A simpler but quite effective variant of this idea has recently appeared on the market, being a sink with two compartments, one with a stopper and one with a drain. Dishes or vegetables can be washed in the stopper compartment and rinsed in the drain compartment. In either case, much to the housekeeper's joy, it is "good-bye, dishpan."

Steel wardrobes and dressing cases are quite often installed in bedrooms where wall or partition arrangements do not favor the old style partitioned off closet. They occupy several inches less space, are lighter and quite impervious to moths or vermin.

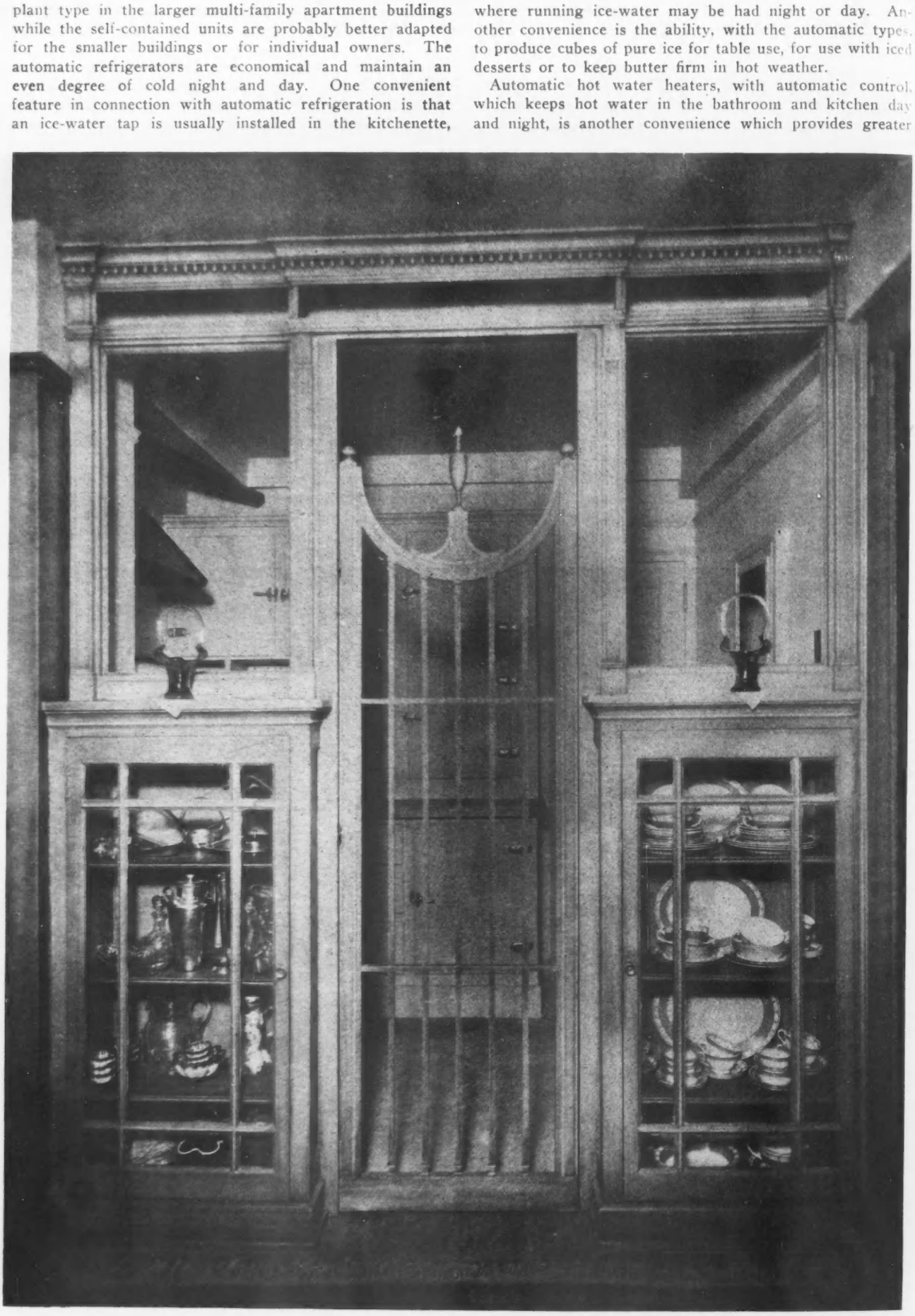
There are numerous types of refrigerators in use, both ice and iceless. Automatic refrigerators are usually operated by gas or electric motor and either can be operated from one central refrigerating plant with cooling coils to all refrigerators in the building or else each refrigerator has its own mechanical unit. There are arguments in favor of both types, but the tendency seems to favor the central



Kitchenette Off the Dining Room of a Large New York Apartment Building. Built-in china cabinets of attractive appearance screen the gas range and sink from view. The gate-leg table in the dining room has an extension feature by which it can be made larger.

plant type in the larger multi-family apartment buildings while the self-contained units are probably better adapted for the smaller buildings or for individual owners. The automatic refrigerators are economical and maintain an even degree of cold night and day. One convenient feature in connection with automatic refrigeration is that an ice-water tap is usually installed in the kitchenette, where running ice-water may be had night or day. Another convenience is the ability, with the automatic types, to produce cubes of pure ice for table use, for use with iced desserts or to keep butter firm in hot weather.

Automatic hot water heaters, with automatic control, which keeps hot water in the bathroom and kitchen day and night, is another convenience which provides greater



This Kitchenette Is Screened from View, Not Only by China Cabinets but Also by a Decorative Grille or Gate. By this method, the appearance of the apartment, especially the dining room, is considerably improved.

convenience for both housewife and janitor. Mixing, or tempering taps, are usually provided, so that water of any desired temperature may be secured.

Heating plants of many different types may be secured, to suit varying requirements. It is becoming quite common to install oil-burners in connection with steam, vapor or hot water boilers because it reduces the amount of janitor help required and substitutes for the imperfect human equation the regularity of service procurable from automatically controlled heat. Thermostats are also quite commonly installed in each apartment, so as to automatically maintain any desired temperature.

Perhaps the greatest space-saving feature of all is the disappearing bed and there are several types of these on the market which either swing or roll into bed closets, usually off the living room, although occasionally off the dining room or sun porch. Disappearing beds can be secured for use as single, double or twin beds, as desired. The use of these disappearing beds has led to especially designed apartments laid out with a view to their use. These are sometimes designed for use in conjunction with other bedrooms or an alternative arrangement provided so that the room with the disappearing bed—say, the living room—can be thrown en suite with the regular bedroom or maintained separately. Designers in locating the bed closets and small dressing rooms aim at as much privacy as possible and also to make bathrooms readily accessible without going through the room where the disappearing beds are in use.

Electric lighting, wiring and switches are being installed in the most complete manner, with convenient outlets for the use of reading lamps, vacuum sweepers, curling irons, toasters, percolators and radio battery chargers. Really beautiful lighting fixtures of brass, silver or bronze are commonly installed.

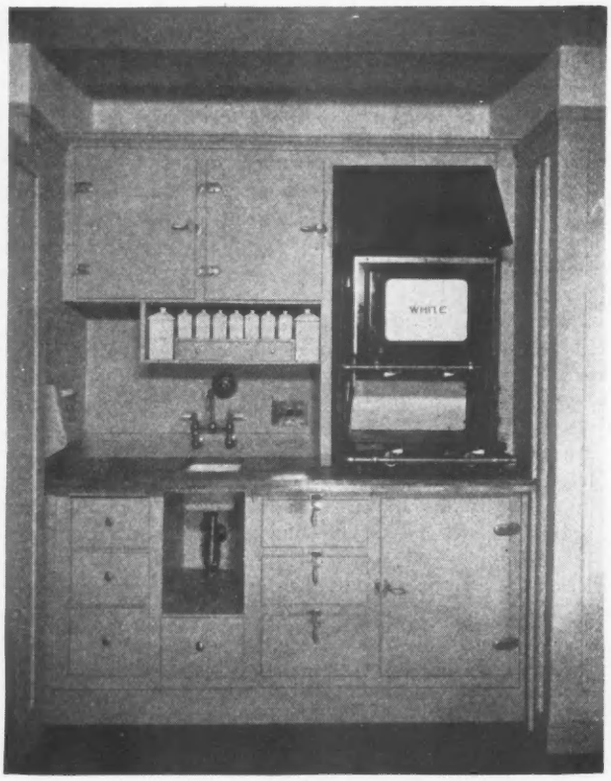
Fine plumbing fixtures are usually a feature of bathrooms in modern apartment buildings, as equipment of this sort makes the suites more readily rentable, as do all the other conveniences. Pedestal lavatories, noiseless, direct-flush closets and seats of sanitary composition are often installed, together with the best enamel built-in tubs, shower cabinets, shower baths and mixing valves and faucets are becoming quite usual equipment. Convenient bathroom cabinets are a necessity. Metal weatherstripped windows also add greatly to the comfort of apartment suites in winter. The rolling screen for summer use is a new feature which bids fare to become popular. It rolls up like a blind and does away with the nuisance of applying and removing outside screens. It is also convenient for window cleaning.

Another space-saving feature is a well-contained or folding lavatory which finds many uses. It is suitable, not only for bedrooms, but also for bath or toilet rooms where a regular lavatory fixture would occpy more space than is available and might cause an interference which would prevent the free opening of the door. It is small and compact, and being set into the wall a number of inches, occupies but little space. Such a space-saving feature is particularly well adapted for use in rooms where there are disappearing beds, so that running water and the use of a lavatory is available in the living room when used at night as a sleeping room.

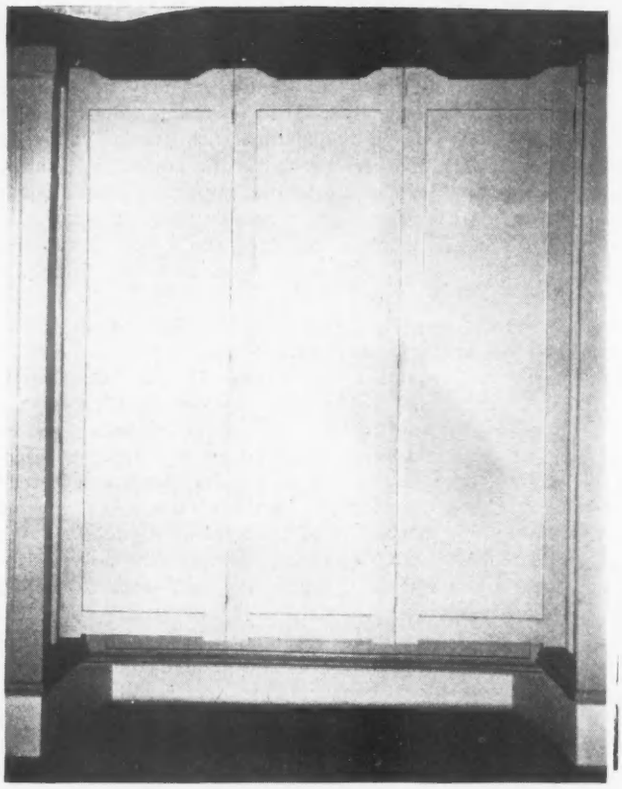
No woman should complain of the drudgery of housekeeping when living in apartments equipped with all these features.



These Wardrobes Occupy Less Space than Most Built-In Clothes Closets and Are Impervious to Moths or Vermin.



This Combination of Sink, Gas Rainge and Kitchen Cabinet Seems to Represent the Utmost Possibility in Space Saving with Built-In Equipment. It has the drawback of dwarfing both sink and gas range and affording only limited case or cabinet space. It would, however, serve quite well for the preparation of breakfasts and luncheons where the tenants go out for table d'hote dinners. It can be completely closed off, as shown in the picture at the right.



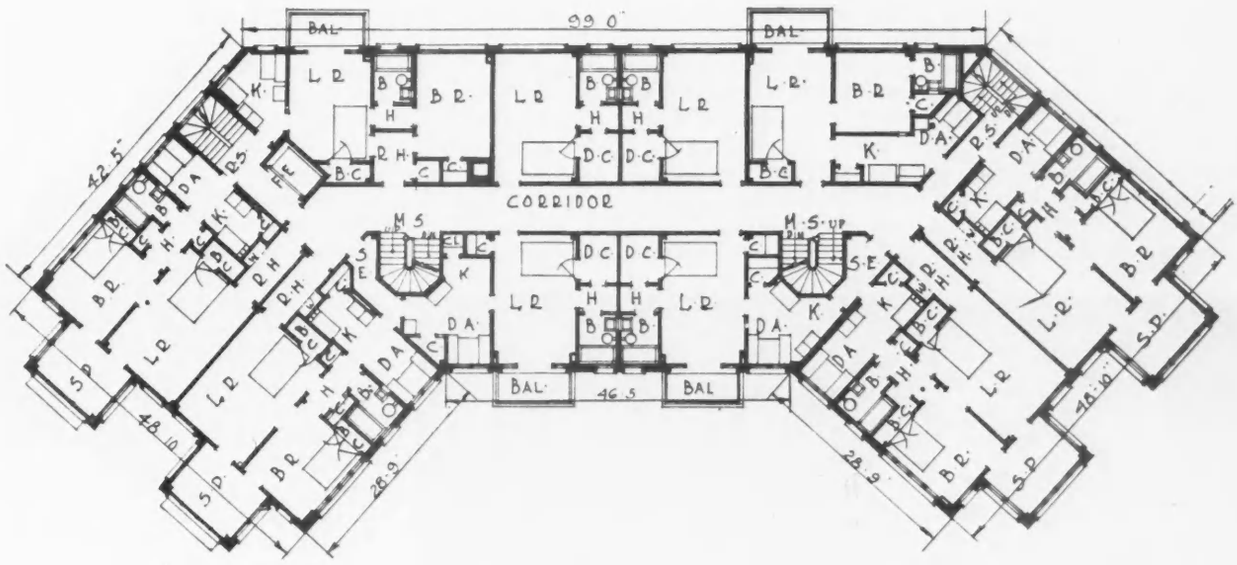
This Is a View of the Kitchenette at the Left When Closed Off by the Swinging Semi-Doors Provided. As can be seen at the bottom of the picture, this kitchenette alcove is only a few feet in depth. Such a kitchenette is ample for light housekeeping where the principal meal of the day is eaten at a restaurant or hotel, being mainly installed in two or three-room suites suitable for but one couple.



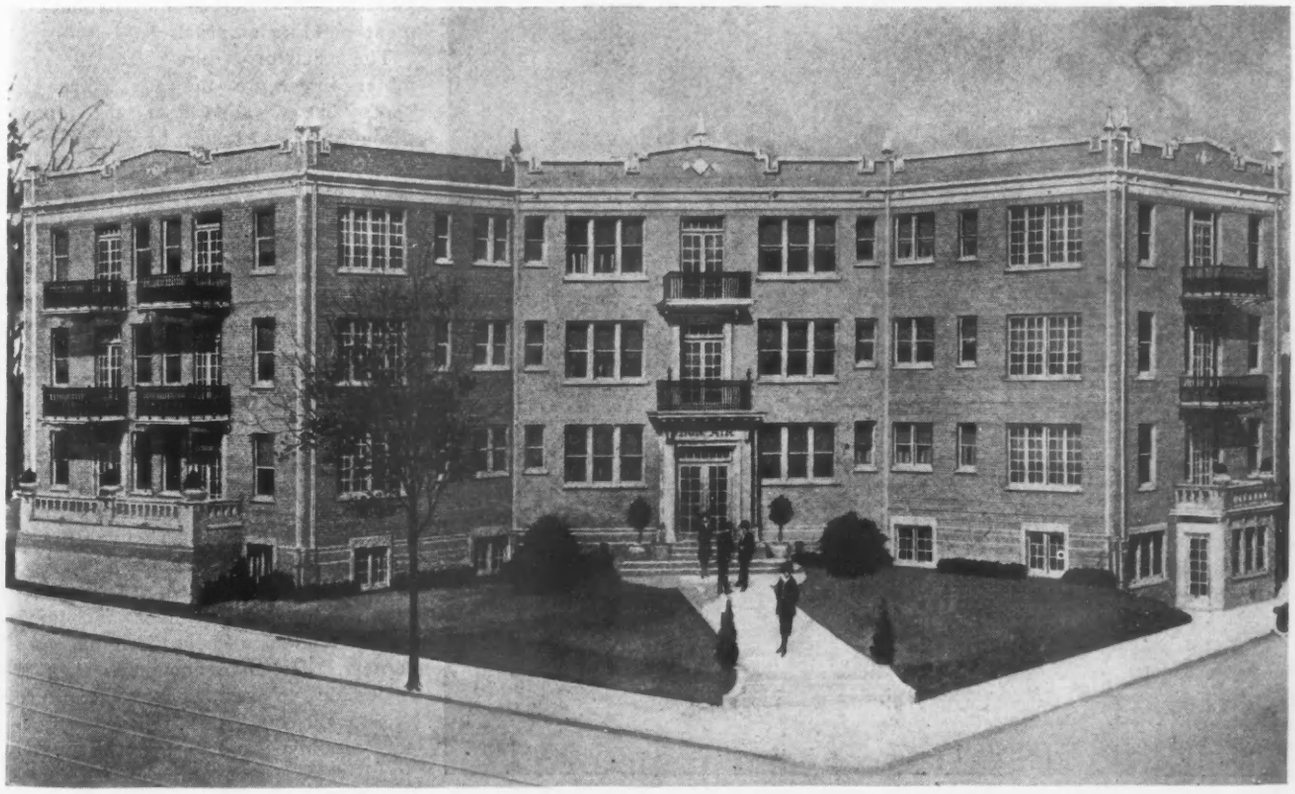
This Very Large Apartment Building Contains Several Hundred Suites and Has Living Accommodations for Over 1,000 Persons. It is located in Detroit and is called "Indian Village Manor." The Berman-Dwyer Realty Company, owners; Borroh and Chaffie, Detroit, architects.

The Bon Air Apartments Atlanta, Ga.

G. Lloyd Preacher and Co., Architects
Gude and Company, Builders



This Typical Floor Plan Shows Ten Small Suites of Apartments, with Living Rooms, Kitchenettes and Bed Closets for Disappearing Beds. Every room has outside light and air and four of the suites on each floor have sun parlors.



The Semi-Octagon Shape of This Building Not Only Permits Grass and Trees in Front But Also Lends Itself Well to Good Orientation. Disappearing beds in living rooms and bedrooms make these suites exceptionally attractive.

New Co-Operative Apartments Being Built in Many Cities

Tenants with Money to Invest in These Apartments Can Often Lower Their Rentals and Secure Finer Living Quarters

BUILDERS, bond houses and real estate investors usually find co-operative and semi-co-operative apartment building enterprises profitable and quickly saleable because of the advantages they offer to tenant-owners. Of course, a word of warning is timely against appraisals based on excessive rental values which cannot be maintained over a period of years. But when the appraisals are conservative, the co-operative and semi-co-operative plans of building, owning and operating apartment buildings have both been found highly satisfactory.

It is surely better, from a civic standpoint, to have these fine buildings erected and to have them tenanted and owned by highly respectable citizens who find in them permanent homes than to have less fine buildings tenanted by a migratory class who move every year, in many cases.

One thing is certain: which is that co-operative and semi-co-operative apartment buildings are usually well designed, well built and equipped, offering the tenant-owners more conveniences, living comforts and even luxuries than they can secure for corresponding rentals in other types of buildings. For these reasons, co-operative apartment buildings offer a profitable and ready market to manufacturers of high class building materials and equipment of all kinds. And professional men, such as architects and engineers, decorating designers and other specialists find quite a large volume of work in designs of this type.



Vista Homes Apartment Building, Now Under Construction Near Chicago's Famous Midway and Overlooking Jackson Park. Suites in this palatial structure will cost tenant-owners for maintenance less than rent.

A recent building of this class, now under construction in Chicago, is quite palatial in its appearance and appointments. This is the Vista Homes Apartment Building, promoted by Albert W. Swayne, one of the leaders in the field of co-operative apartment construction and operation. In fact, Mr. Swayne has served several terms as chairman of the Co-Operative Apartment Division of the National Association of Real Estate Boards, and has successfully promoted quite a long list of these co-operative apartment building enterprises.

The usual procedure is for the promoter to secure the site, have the plans drawn and float the bonds through a mortgage bank or bond house. Sale of the apartments proceeds during the promotional and construction period and there is often a waiting list of customers after all apartments have been sold. These people then form the nucleus for the next co-operative apartment building enterprise by the same promoter.

During the promotional period, a corporation is formed which constitutes the tenant-owners organization as the stock is sold to them. When the building is ready for occupancy, the owners meet and elect a directorate and adopt a budget. Frequently, the management of the building is turned over to experienced, professional managers from the office and under the direction of the original promoters. The management is then responsible to keep the expenditures within the budget, purchase supplies, hire employes and perfect the service, keep the interest, amortization and taxes paid on time. Last, but not least, they look after the tenant-owners' individual requirements and keep

them satisfied with the service. For this, a manager is required having considerable tact and ability.

Vista Homes is located on the north side of the Midway, overlooking Jackson Park and the Lake, with a court sufficiently wide to give a view of the park from all apartments. The building is to contain the following suites:

Fifteen seven-room apartments with three baths each.
Fifteen six-room apartments with three baths each.
Fifteen six-room apartments with two baths each.
Forty-five five-room apartments with two baths each.
Thirty four-room apartments with one bath each.

The court and front of building will be faced with either Bedford stone or terra cotta trim. The English basement in front and in the courts as far back as the first entrances will be faced with either Bedford stone or terra cotta. The architecture of the building will be Gothic and will give an exceptionally rich appearance. The building will be equipped with the most modern high-grade plumbing and electric light fixtures. In addition to the usual equipment of apartment buildings of this class, each apartment will have mechanical refrigeration. All master bathrooms will be tiled and equipped with the most modern shower baths. An unusual number of closets of large size are provided for each apartment and each apartment will be supplied with a cedar chest or closet.

The window equipment throughout the building will be of the best and most modern type. Four passenger and four freight elevators will be installed. The seventeenth floor will be used for locker rooms and laundries.

All of the rooms in the building are large and so arranged that an unusual amount of light and ventilation is provided. All kitchens and butlers' pantries will have cabinets designed and built by a leading kitchen cabinet manufacturer. Vestibules of the building will be commodious and all front entrances of the building will be built to give a very handsome appearance. The court will be laid off with double walk and cross-walks in such a way as to permit of impressive landscaping.

The building is to cost, with site, $2,213,300.00, but the capital stock of the corporation is only $613,300.00, the difference being covered by the mortgage loan. Amortization of principal and interest, as well as the operating expense, are figured in and included in the monthly assessments of each tenant-owner, so that the entire loan will be paid off in five years.

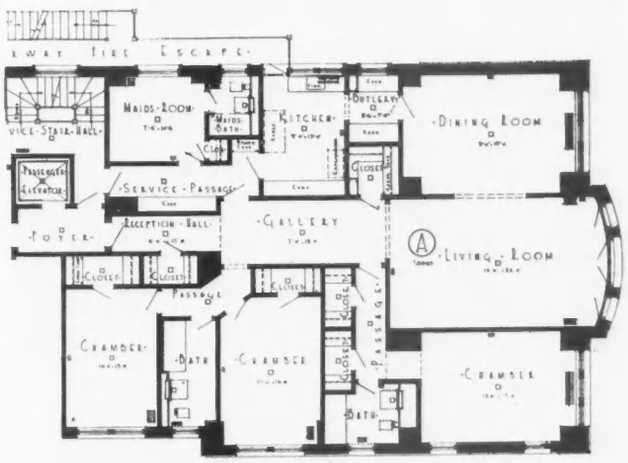
A comparison of the cost to tenant-owners in Vista Homes and the amounts they would have to pay for rental in non-co-operative apartments, is shown by the following figures of the promoters, as applied to typical four and seven-room apartments:

Example: A Four-Room Apartment

Rental basis:
5 years rent at $200.00 per month... ..... $12.000.00



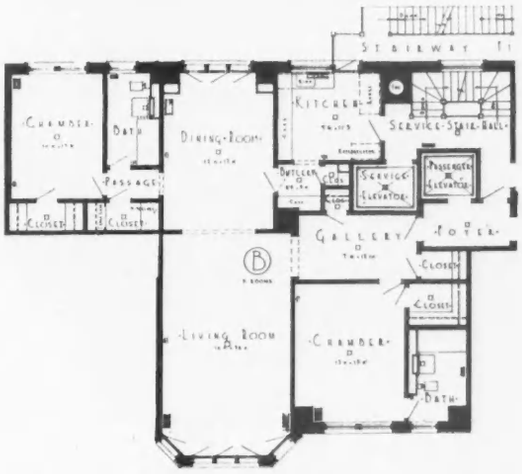
These Are the Third Suites from the Front in the North Wing and Have Five Rooms Each. There are forty-five five-room suites in the building, each with two baths.



There Is a Seven-Room Suite Similar to This on Each Floor with Windows Looking Towards Jackson Park. There are fifteen suites of this size in the building. Each has three baths.



These Four-Room Suites Facing the Court Look Towards the Front. There are thirty four-room suites in the building, each with one bath.



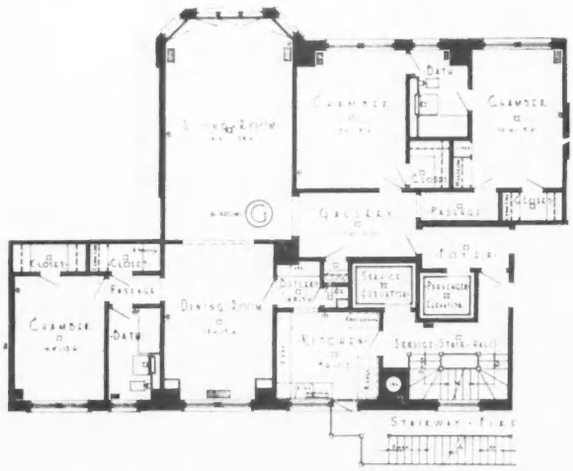
Five-Room Suites Like This Are Directly Back of the Front Suites on Fifteen Floors of the Building with Windows to the North and on the Court. There are two baths with each.

Ownership basis:		
Initial investment	$ 2,560.00	
Estimated total assement for 5 years	3,600.00	
Total cost for 5 years	$ 6,160.00	
Net cash saving		$ 5,840.00
Book value of stock at end of 5 years		3,580.00
Total savings		$ 9,420.00

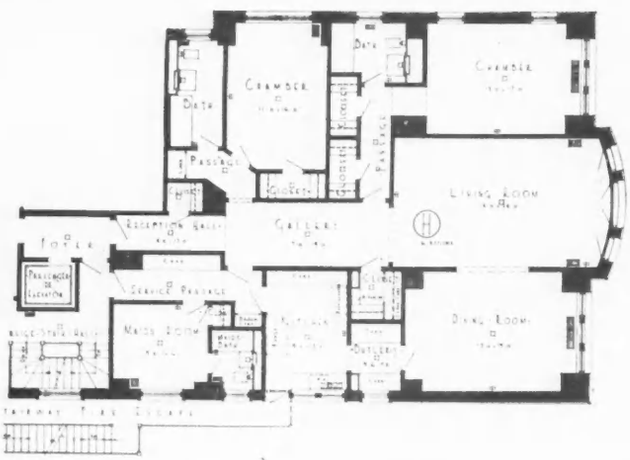
Example: A Seven-Room Apartment

Rental basis:		
5 years rent at $350.00 per month		$21,000.00
Ownership basis:		
Initial investment	$ 7,770.00	
Estimated total assement for 5 years	10,680.00	
Total cost for 5 years	$18,450.00	
Net cash saving		$ 2,550.00
Book value of stock at end of 5 years		10,770.00
Total savings		$13,320.00

The rental value of $50.00 per room is fixed by Mr. Preston Nolan in an appraisement of this building made by him for the purpose of a life insurance company loan.



These Six-Room Suites on Practically Every Floor Are Second from the Front in the South Wing with Windows on the Court and Also to the South. Of the thirty six-room suites in the building, fifteen have one bath each.



There Are Six-Room Suites Similar to This on Fifteen Floors at the Front. Their location corresponds to Suites "A" except that they are in the south wing. They have two baths each.

Maintaining a Skyscraper

SHOW places of New York City are myriad, but none, perhaps, attract more attention than the great skyscrapers for which the metropolis is distinguished.

These huge office buildings are more than mere towers of steel and granite. They have been acclaimed by the architects of the world as masterpieces of the leaders in that profession. This is particularly true of three outstanding structures which house thousands of business men and women—the Metropolitan Life, the Woolworth and the Singer buildings.

There is one side of the buildings, however, to which visitors give little attention and about which they are little concerned. It is that having to do with the care and operation of the many departments necessary to the successful conduct of the huge structure and the proper safeguarding of the tenants, together with adequate service.

An investigation of this phase of skyscraper administration is a revelation. For instance, examine the records of the Metropolitan Life Building and discuss with J. Arthur Pinchbeck, its superintendent, the problem he handles with the help of his assistant, Irving T. Stevens. These two men supervise the building workers.

Exclusive of the engineering force and the electrical workers, who number about one hundred, they have on their rolls 478 employees; and they are not all cleaners, either.

There are 193 charwomen, 26 carpenters, 77 porters, 67 in the elevator force, 7 plumbers, 4 housekeepers, 14 matrons, 12 varnishers, 19 painters, 5 special officers, a tailor, 14 watchmen, 12 window cleaners, 5 masons, 8 mason's helpers, 2 bronze polishers and 2 marble polishers. In addition there are about 15 other workers employed in various occupations.

The carpenters, varnishers, painters and masons are employed constantly in preserving the building, rebuilding when it is necessary. The bronze and marble polishers are kept busy at the trimmings in the various offices and the charwomen and porters find it no easy task to keep clean the vast number of offices this huge structure houses, with its two buildings, covering more than a city block to a height of 12 stories and the tower which rises to a point 41 stories above the street.

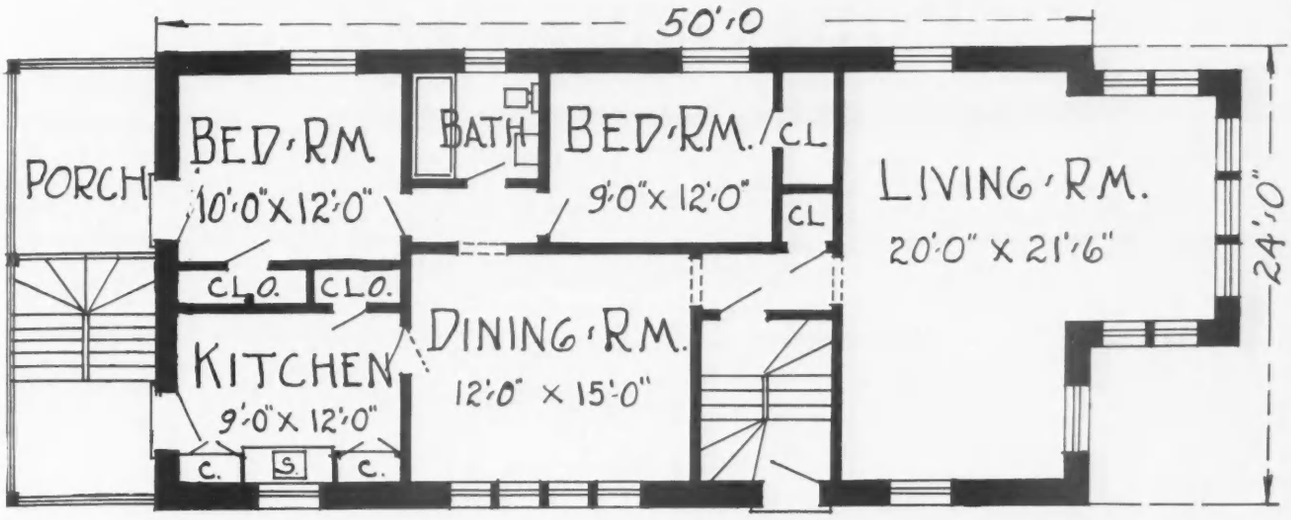
One feature of the Metropolitan building's administration of which Superintendent Pinchbeck is boastful is the smart appearance of the uniformed force—the elevator operators, starters and special officers. The answer to this is found in the tailer, who is a part of the establishment. His sole duty is to keep the uniforms in repair and well pressed.

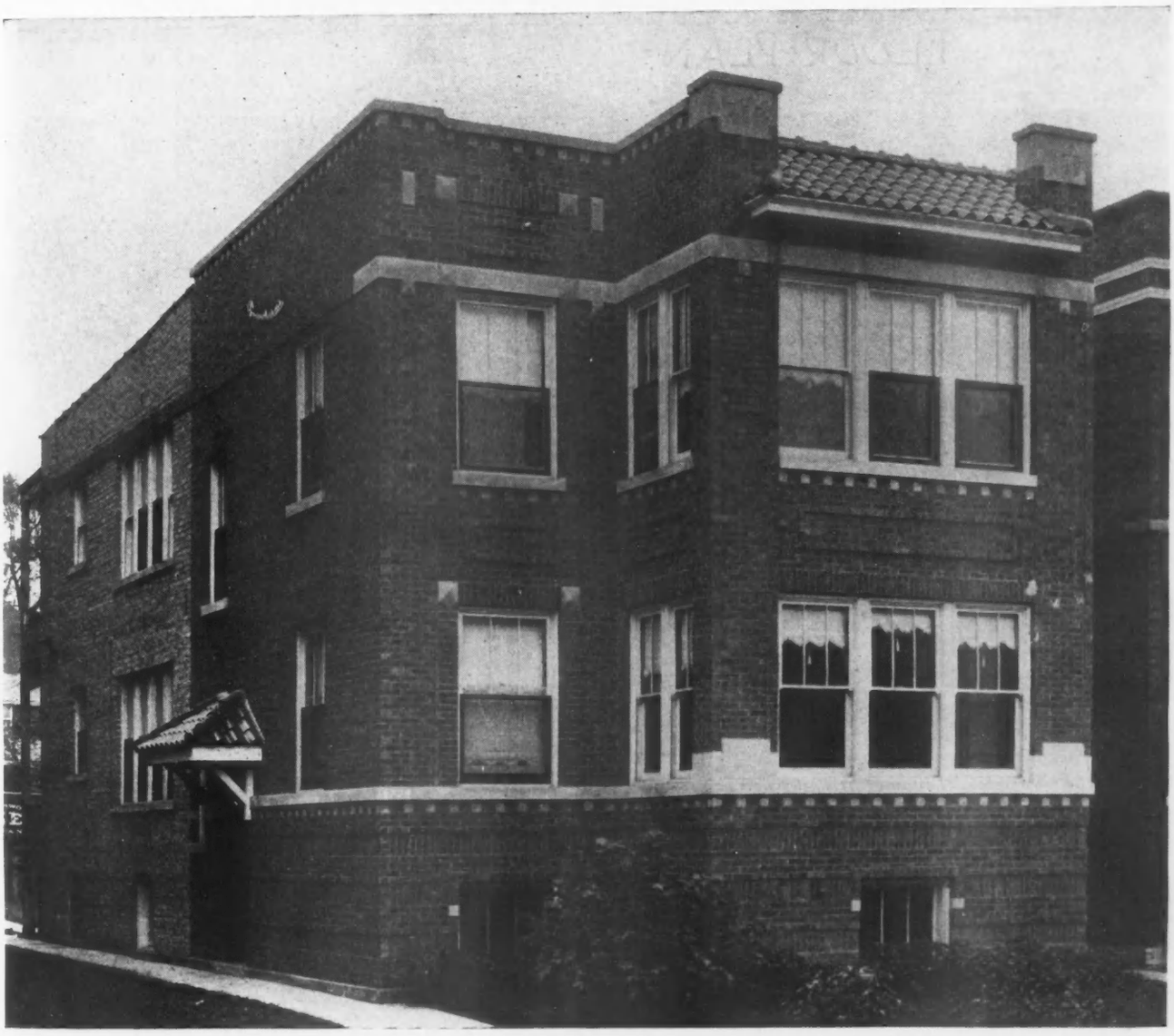
Many of these 478 workers have been employed by the Metropolitan for 15 years or more. As a matter of record the superintendent believes the labor turnover bothers him less than it does any other building superintendent in the city. Such jobs are usually filled by "floaters," hence records of long service as shown here are something of which to be proud.

Margaret Sheehan, one of the charwomen, has been a company employee 31 years and Delia Donovan more than 28. George Kuhlkin, inspector of elevators, wears a service medal showing 27 years of service and there are scores of men and women workers who have passed the 20-year mark.

"There's no secret about it," says Superintendent Pinchbeck, and Stevens, his assistant, agrees. "We treat them as fellow workers and they like it here. We know they are just as necessary to the proper administration of the Metropolian Life Building as we are and are deserving of every consideration."

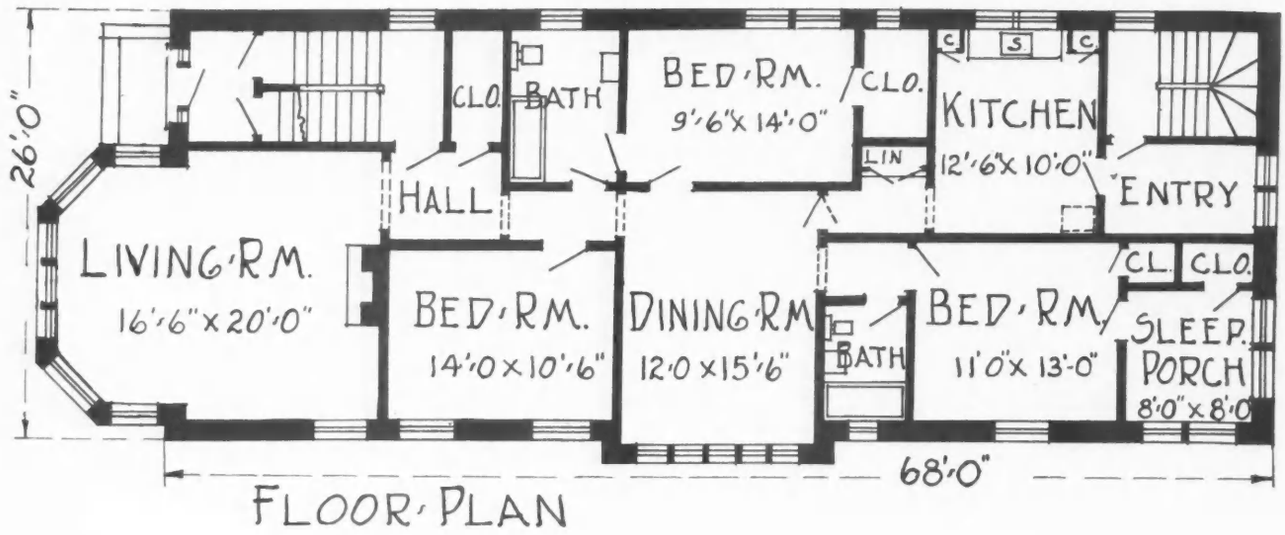
Popular Two-Flat Building





The Above Is an Excellent Design for a Two-Flat Building on a Narrow Lot. The wide bay in front, with its seven windows on each floor, is a desirable feature for light and air. The plan shows a conveniently arranged five-room suite on each floor and practically no waste hall space. The living room is commodious, 20 feet by 21 feet six inches, and has an unusual number of windows.

A Two-Story Apartment Building With Gable Roof



FLOOR PLAN



This Type of Apartment Building Is Sometimes Called the Suburban Two-Flat Because Its Fine Appearance Fits It for Better Class Residential Districts, Having Almost the Appearance of a Single Family Dwelling. A noticeable feature of the design is the double garage in the basement with entrance on the side street. The floor plan is convenient and commodious and, it will be noticed, provides two bathrooms for each six-room suite. One of the smaller bedrooms is without a closet, as a wardrobe unit was thought more desirable in this particular location.

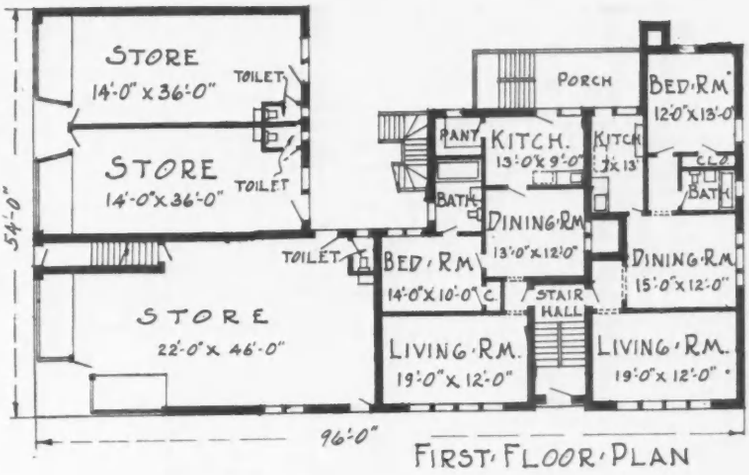
Two-Story Apartment Building With Stores

Meeting Combined Needs at the Intersection of Residential and Business Street

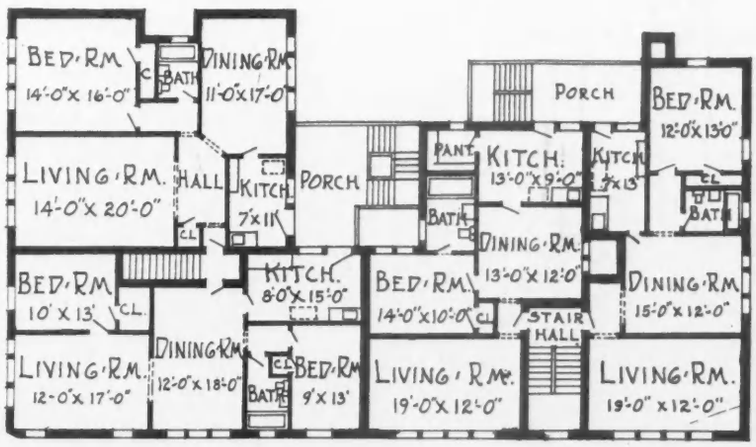
THE plan provides for three stores fronting the main street, four four-room apartments with a separate entrance on the side street and two similar suites of apartments over the stores. Access to the apartments above the stores is gained through an entrance and stairway between two of the stores.

Metal store fronts with full opening plate glass windows and prism transom lights make the stores in this building modern, attractive and readily rentable.

The corner store is a good size—22 feet wide by 46 feet in depth—and has the convenient corner entrance, so much in demand. The other two stores are of the smaller type which can be leased at the lower rentals so much sought after. Ample wagon space is provided at the back for loading and unloading at all three stores.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

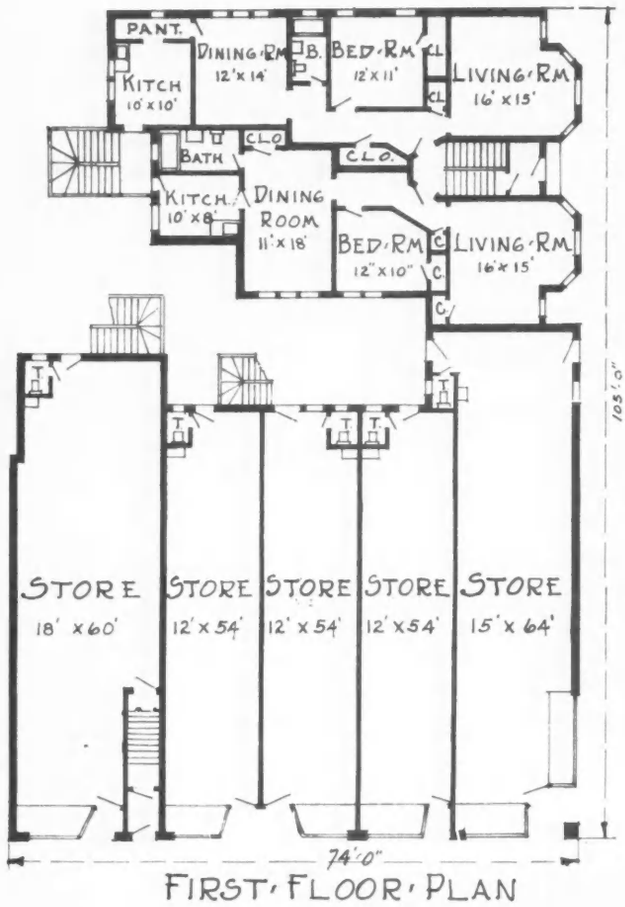
The problem in design offered by a site and building of this character is mainly to utilize the rear half of the lot and make it productive of profitable revenue. This side street being residential, has led to the design of a rear wing which is purely residential in character.

All the apartments in the building have been arranged in four-room suites, because it has been found from actual experience, that this size suite is most readily rentable in a building of this location and type. The living rooms are all of a good size, the dining rooms a good medium size, with rather small bedrooms and kitchens. The service porches and entrances from the rear have been well worked out, to be reached from the side and rear. The brick stack for the basement boiler room has been placed outside the rear wall of the residential wing where it causes no interference with the interior floor plan arrangement.

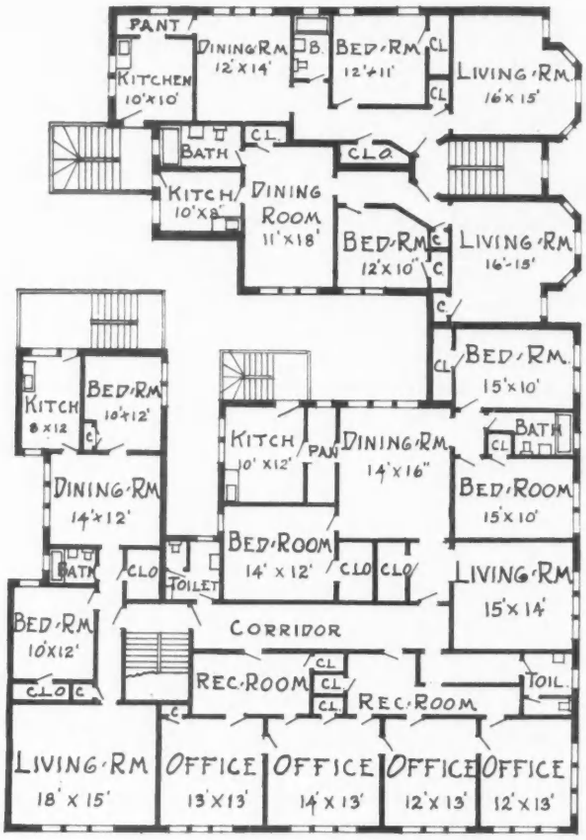


This Is a Type of Building Which Is in Great Demand in Outlying Shopping Districts Where Residential Streets Intersect Business Streets.

Business Block Well Planned for Revenue



FIRST FLOOR PLAN



SECOND & THIRD FLOOR PLAN

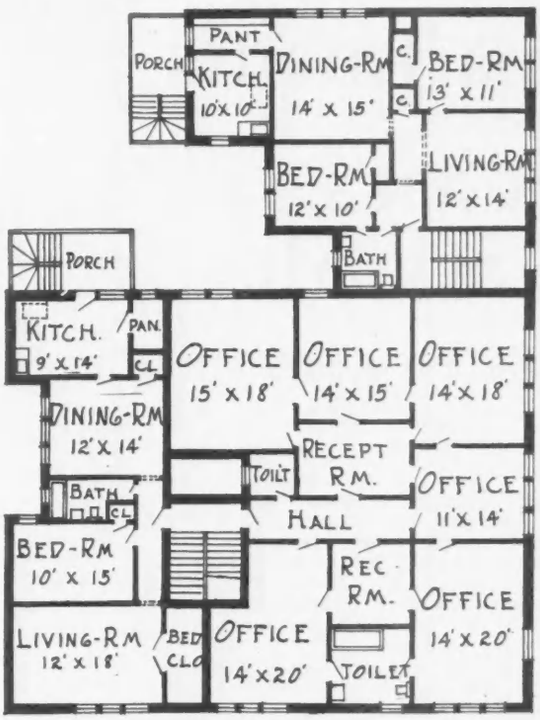


This Is a Well Planned Apartment, Store and Office Building. Three of the apartments are in an annex on the side street with separate entrance. Doctors' and dentists' offices face the main street on the second and third floors.

3-Flat Store and Office Building Made Attractive with Terra Cotta



FIRST-FLOOR-PLAN



SECOND & THIRD-FLOOR-PLAN



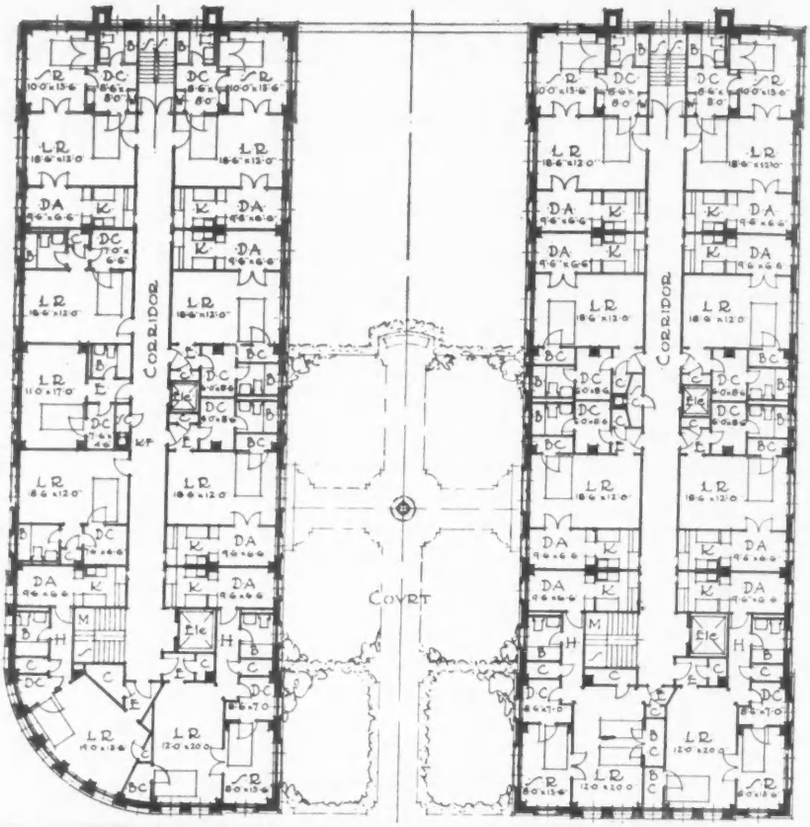
This Design Shows an Ideal Arrangement of Stores, Offices and Apartments for Business Corners Where the Side Street Is Residential. The plan provides three good sized stores with living quarters at the rear and two floors of offices and apartments above.

The Peacock Apartments

Kansas City, Mo.

Ernest O. Brostrom, Architect

Typical Floor Plan to the Right Shows Each Apartment to Consist of Living Room, Dressing Closet, Bathroom, Dining Alcove and Kitchenette. There is elevator service in each wing. The corridors require artificial lighting.



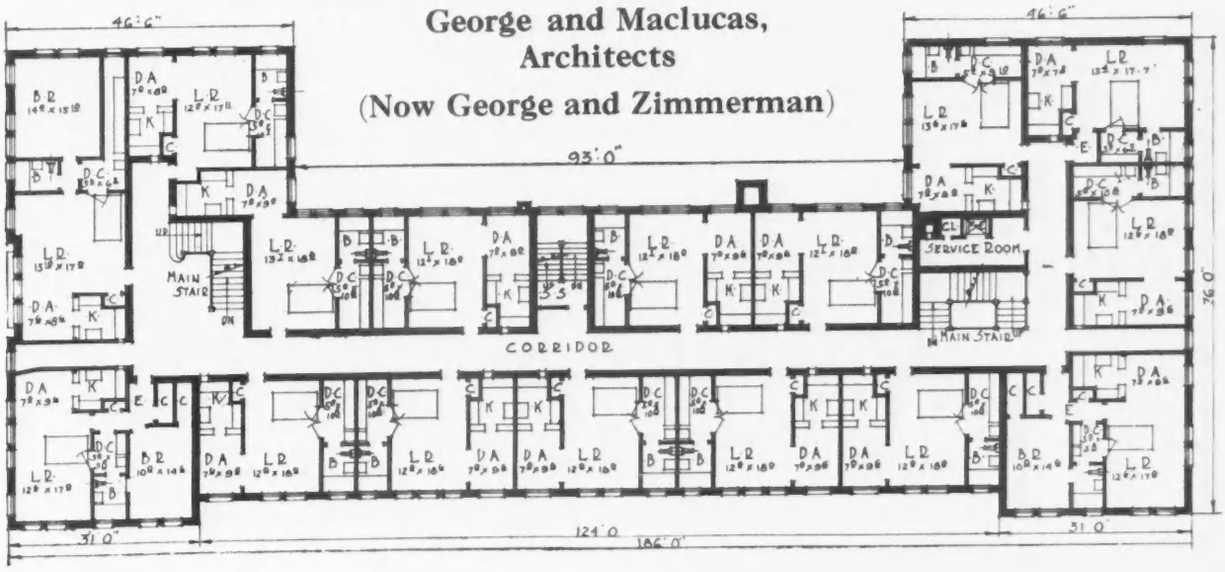


The Two Wings of This Fine Apartment Hotel Are Connected Only on the Ground Foor and This Liberal Light Court Allows Full Daylight to Each Room. Full use is made of the disappearing bed feature and beds of this type only are used throughout the building.

The Seville Apartments Indianapolis, Ind.

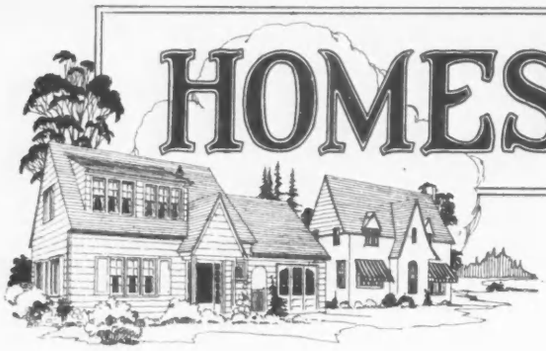
George and Maclucas, Architects

(Now George and Zimmerman)





The Use of Disappearing Beds Throughout This Indianapolis Apartment Building Saves Considerable Space and Adds Materially to the Number of Rentable Apartments. The typical floor plan above shows that each suite consists of living room, dining alcove, kitchenette, bath and dressing closet.



HOMES IN COLORS

By WILLIAM A. RADFORD
President and Editor-in-Chief of the American Builder

Plans Here—Specifications in Advertising Pages

THE most satisfactory and best selling home today is a combination of striking design for the exterior and of efficiency equipment and smart appointments for the interior.

Good construction we can take for granted; for with the expert knowledge and skill now present among builders any of the standard construction materials can be so handled as to make a well constructed job.

In home building, the same as with present-day automobiles, good and lasting construction is expected and is the general rule. Popularity and big salability depend on the lines of the car—or of the house—and upon its appointments.

The home builder today is short-sighted if he puts his money into anything but a well built and **well designed** home. It costs very little if any more to build from a good plan that puts in those clever little touches here and there that give the house that individual and attractive look which means so much when the place is offered for sale.

Many builders are still drawing their own plans and are not giving enough thought and study to them to keep them up-to-date and in line with what the best people want today.

Here is where the American Builder with our "Homes in Colors" comes in to help, by picturing the best and most popular designs that are topping the market in those cities and suburbs where building for sale is most active.

Here are the designs—use them as they are, and from the working plans that are available; or modify and adapt them to suit your individual needs. Consult with your local architect, builder, realtor, lumber dealer or other qualified local building authority and work out the plan that will best serve.

Use these Homes in Colors for the architectural suggestions they contain and then turn to the advertising and reference pages of this magazine to formulate your specifications for your new home or other new building.

The most reliable manufacturers serving the building field are illustrating their goods and services in this publication for the benefit of American Builder readers. Study these pages and inform yourself on the materials and equipment and accessories that will make your new buildings really modern and the best according to the latest standards.

American Builder Homes in Colors for the design of your new homes and American Builder advertised materials and equipment for their construction and finish guarantee the acme of value and success in your building enterprise.

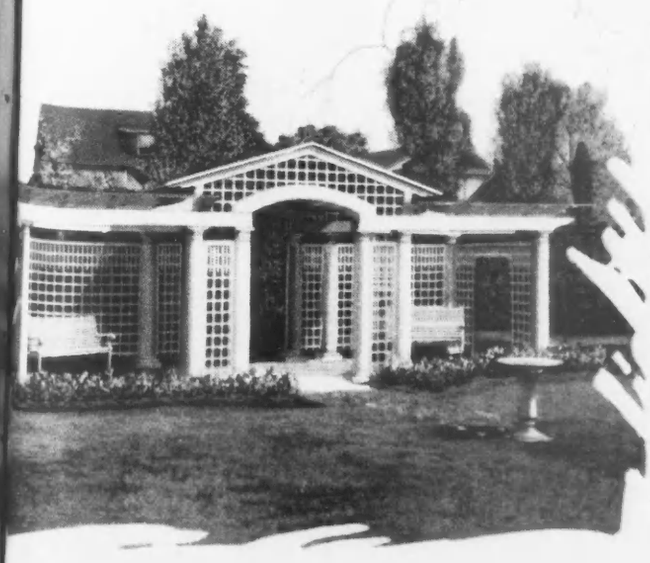


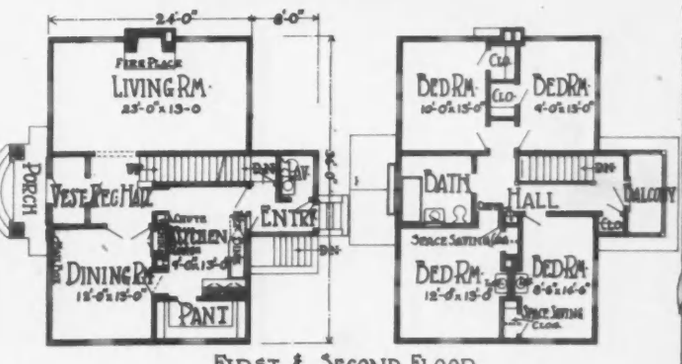
Pat. March 15, 1921 and Sept. 30, 1924.
Copyright 1926, Wm. A. Radford, Chicago.

The SAGAMORE

THE old favorite square hip roof type which gives the most in size, comfort and convenience for the least amount of money. It is an old adage among builders that corners cost money. This design in simple rectangular form makes full use of every square foot of space and has no unnecessary corners or angles. An interesting feature of the floor plan are the lavatories built into the bedrooms and the space-saving wardrobe equipment in the clothes closets. Color sketch to right gives a glimpse of the cheerful fireplace in the living room.

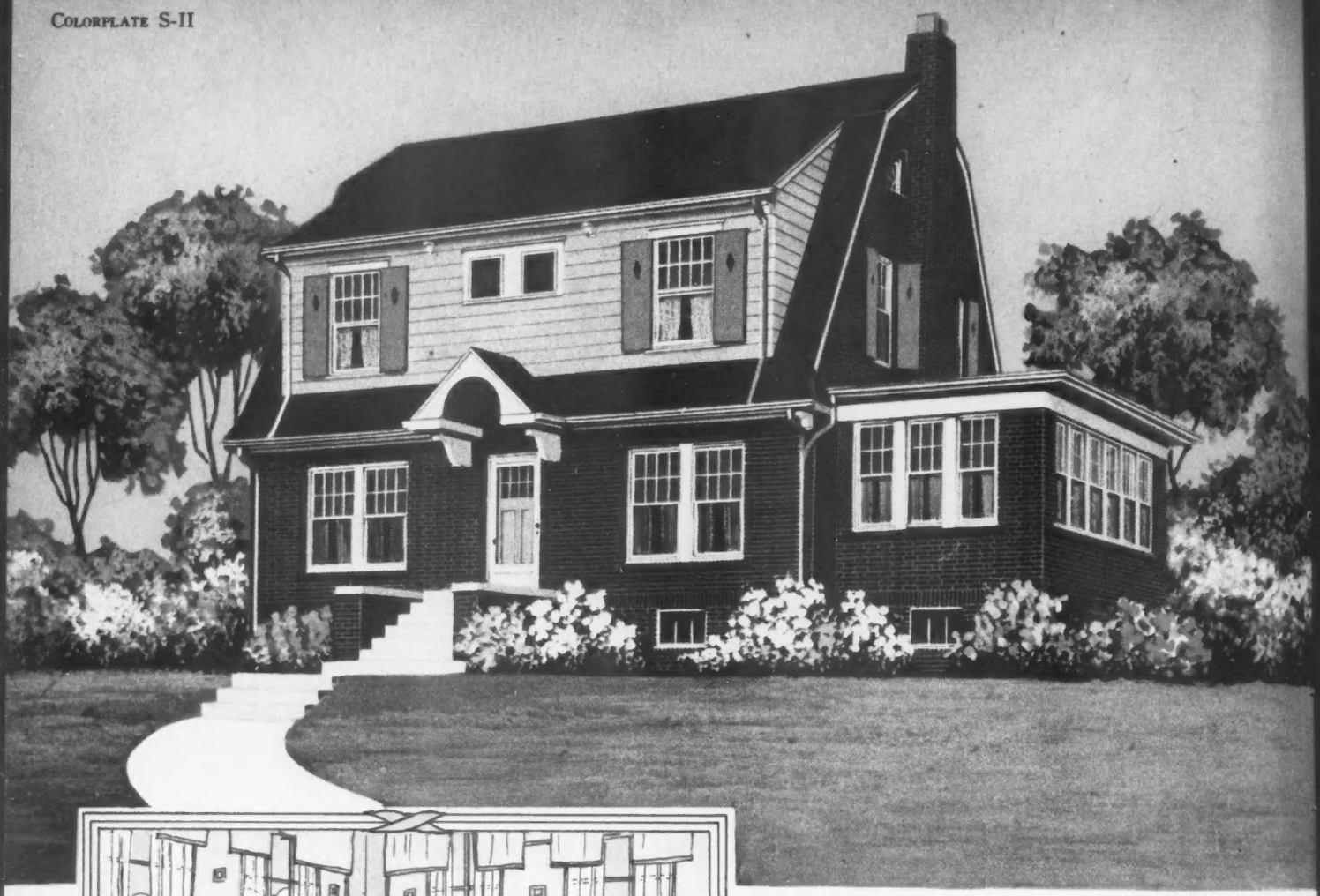






FIRST & SECOND FLOOR

COLORPLATE S-II



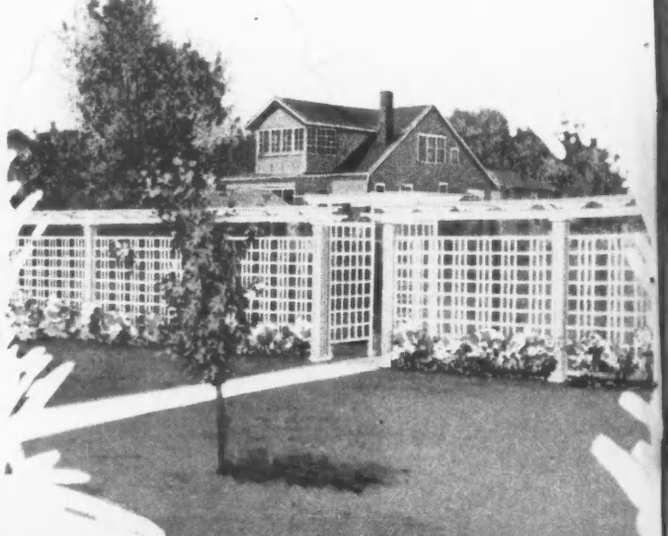


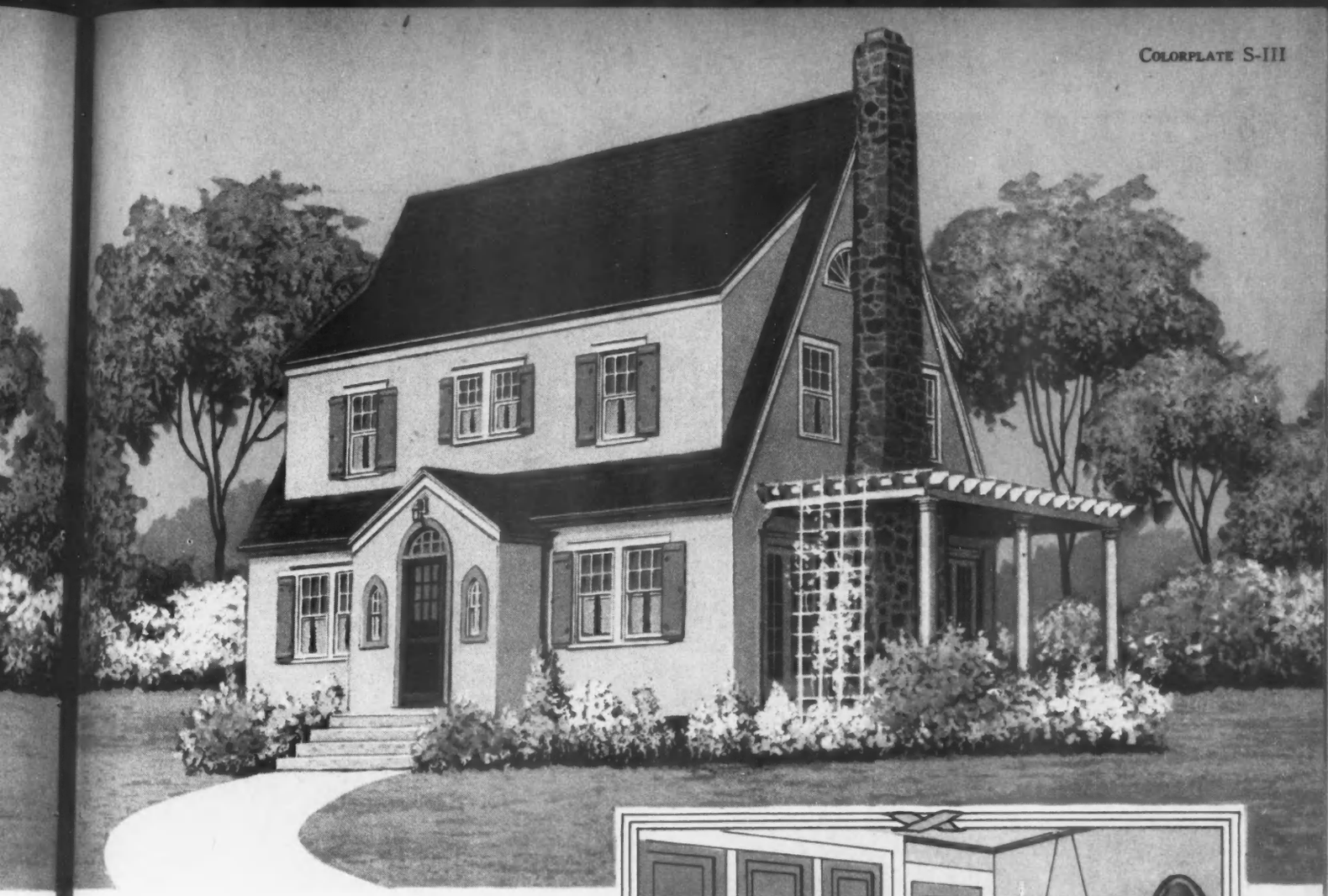


FIRST & SECOND FLOOR

The SAFE HARBOR

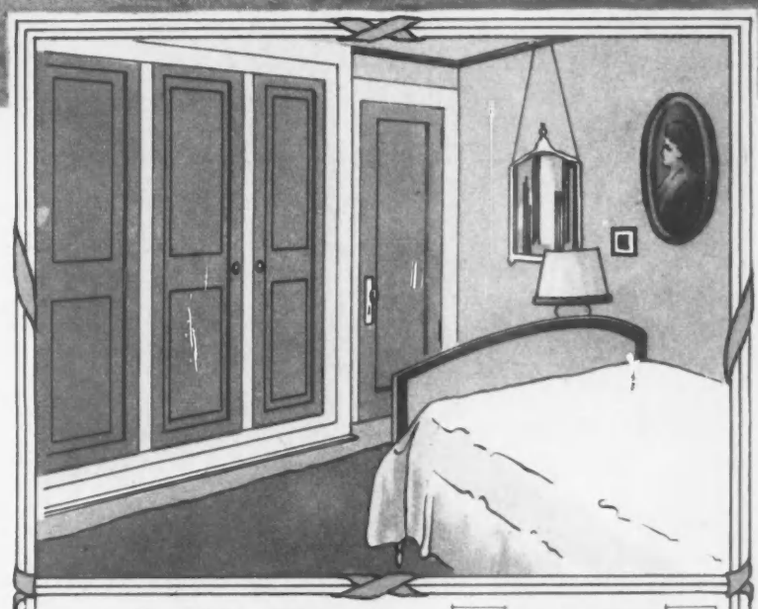
A DELIGHTFUL brick house of Dutch Colonial design, 25 feet wide by 37 feet long, plus the 12-foot sun porch. Three big bedrooms are provided in addition to the bathroom and several large closets upstairs. Two of these have the space-saving wardrobe equipment. Color sketch to left shows what a delightful room the sun porch is opening with two doors off the living room.

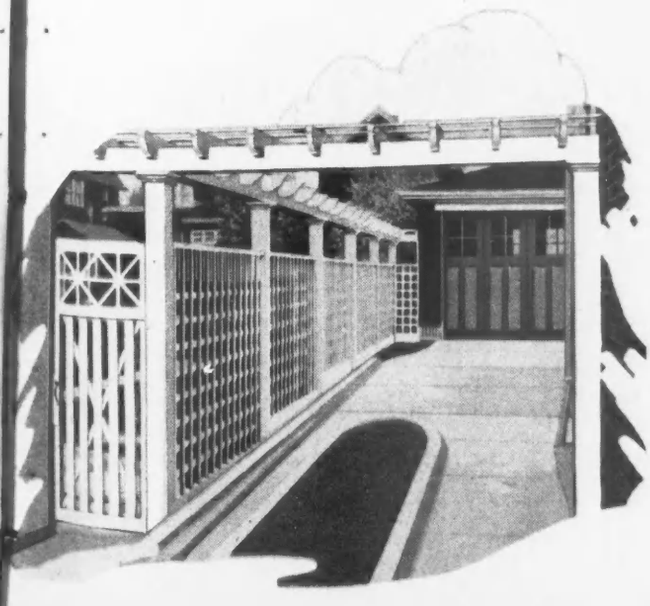


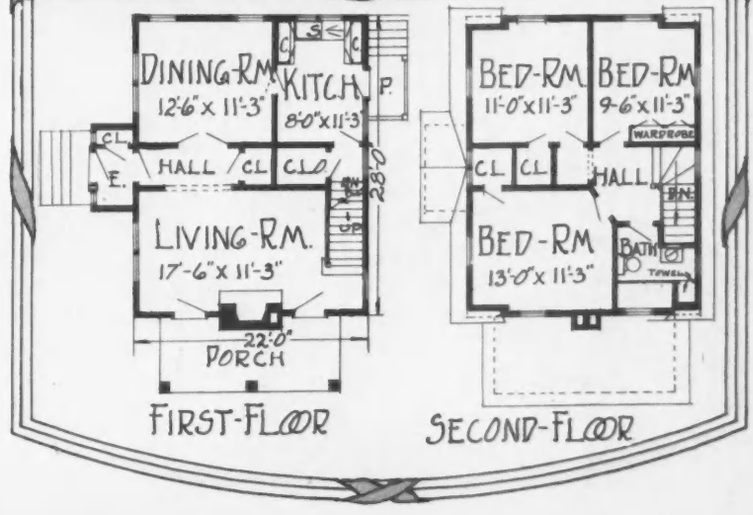


The SAYBROOK

AN English stucco design of smart lines and very satisfactory arrangement for a small home. The dimensions are only 22 by 28 feet, yet the impression is of a very much larger house. The stairs go up out of the living room, a good device for saving space. The group of living room, hall, dining room across the front of the house really possesses an air of spaciousness quite surprising considering the dimensions of this home. Color sketch to right shows one of the bedrooms with its battery of built-in wardrobes.

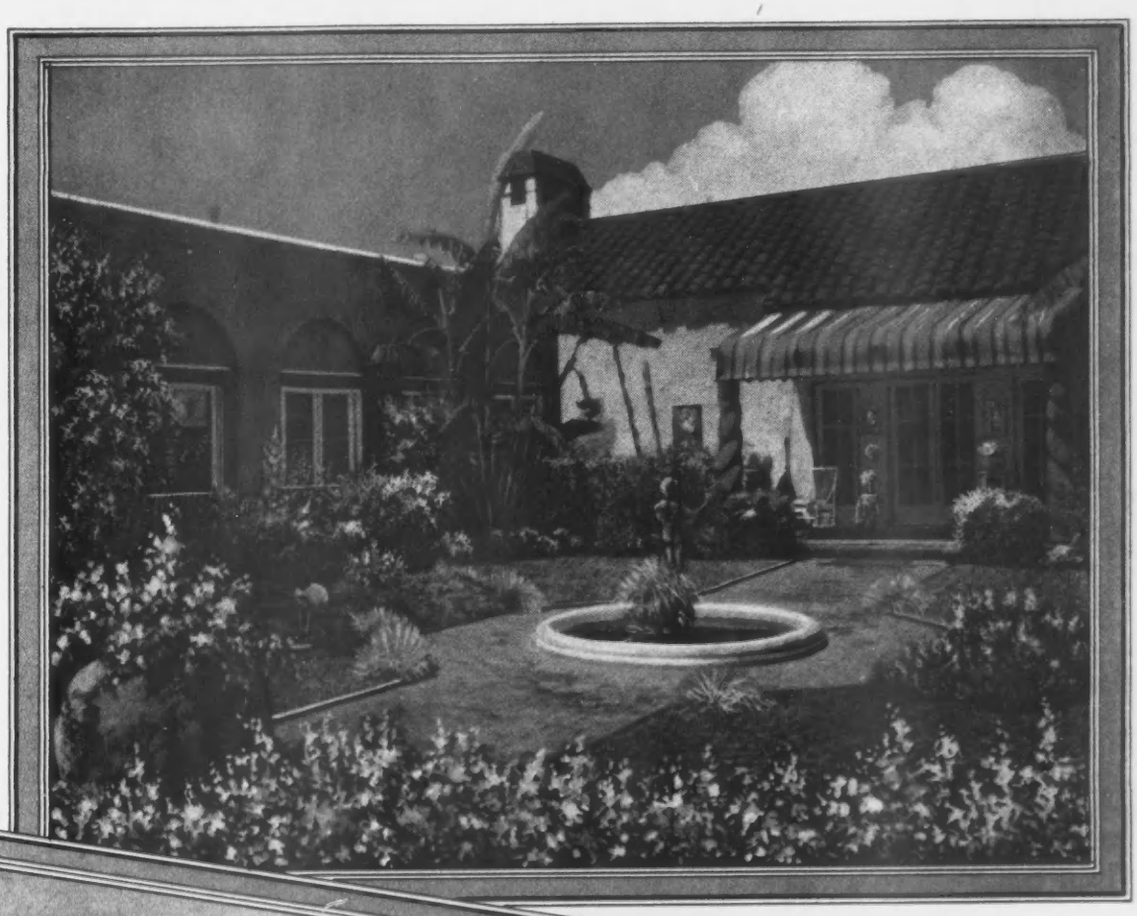








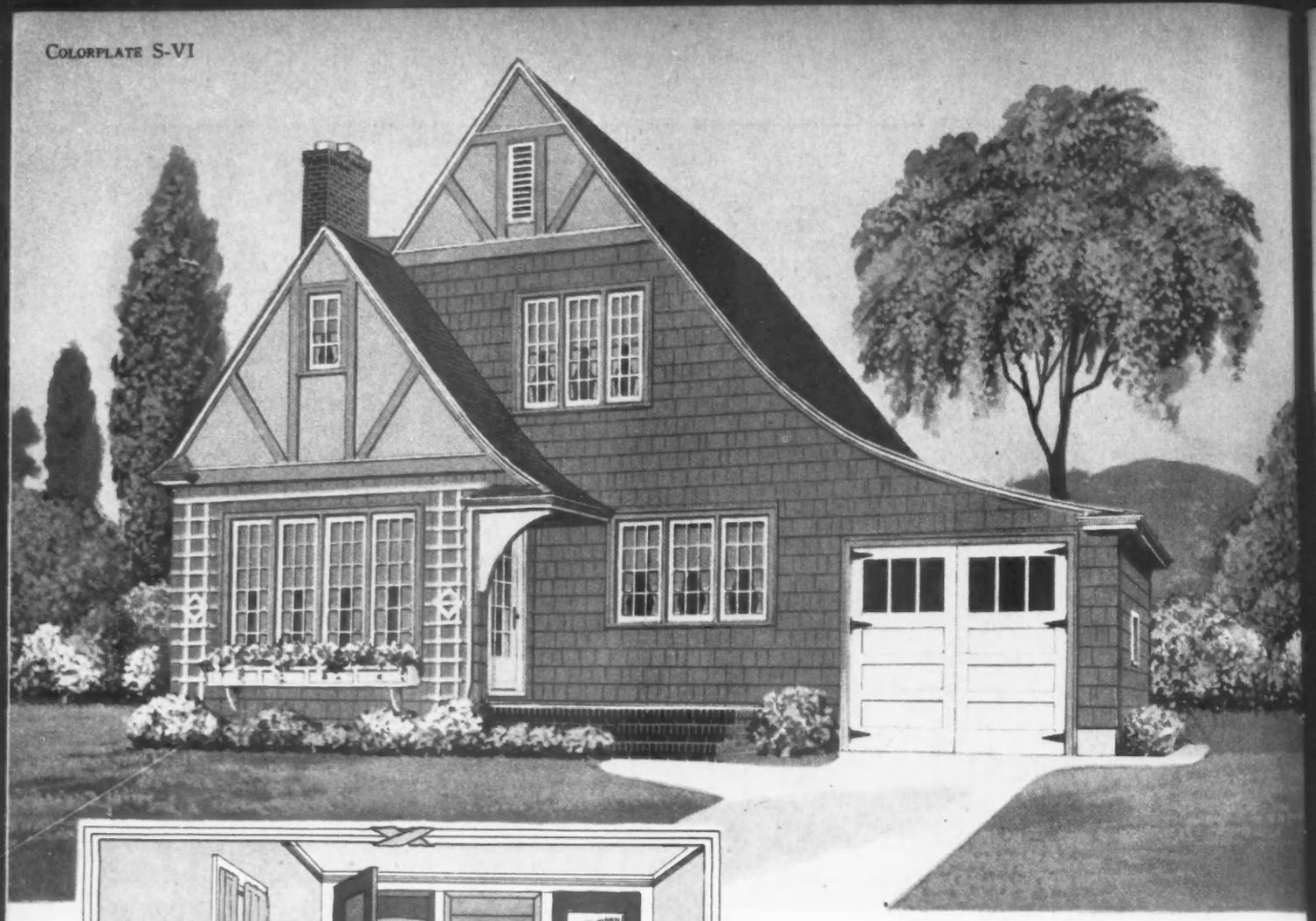
THE patio garden in the home of Mrs. E. W. Halliday, Santa Monica, California. Henry F. Withey, Architect.



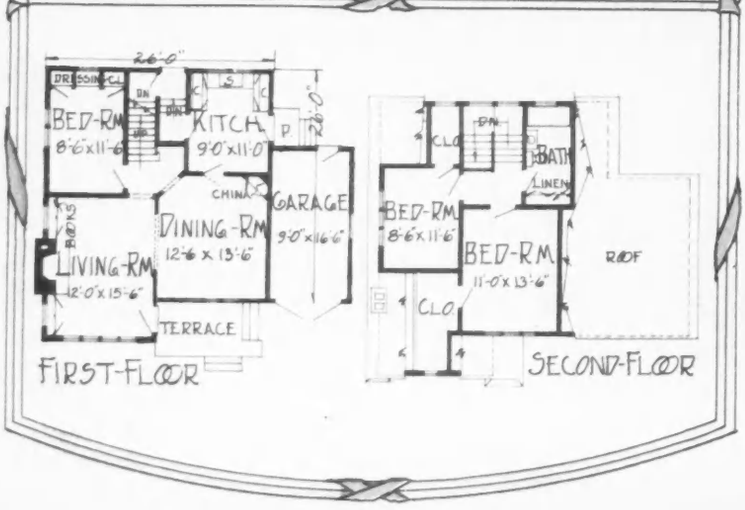


TWO general views of the Halliday patio garden. A fine example of the blending of horticulture and architecture.

COLORPLATE S-VI

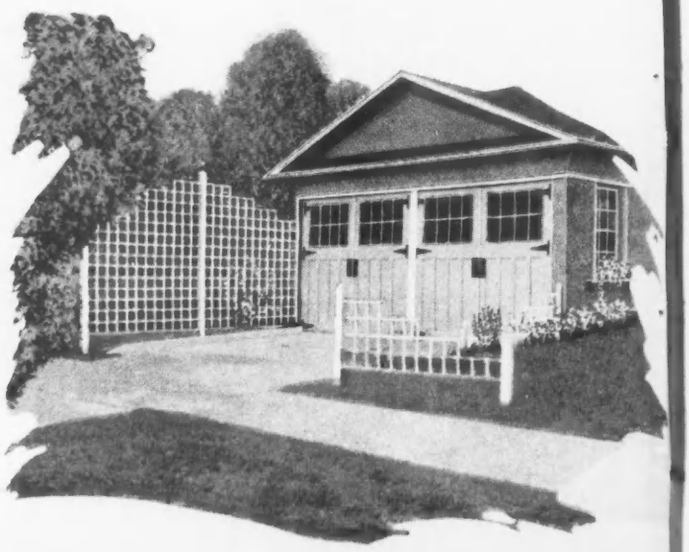






The SALINA

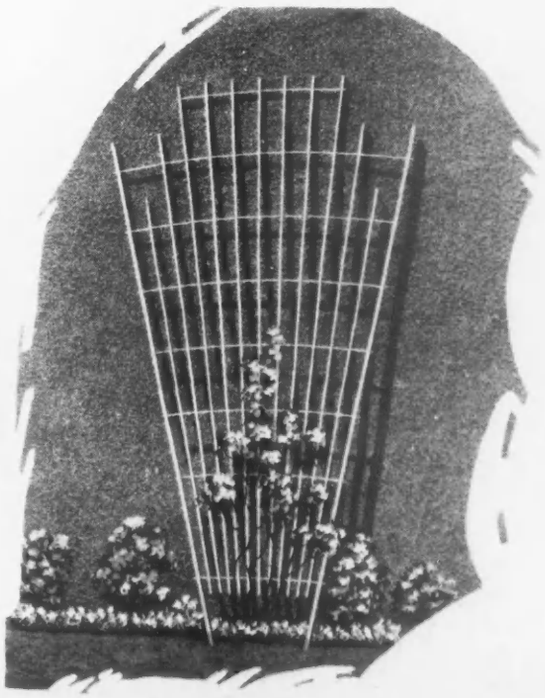
A DELIGHTFUL English cottage with attached garage. The house proper is 26 feet wide by 32 feet deep. The garage addition carrying the roof line out in a graceful sweep extends the width 9 feet more. Those who have had experience with the attached garage with its convenience and ease of heating, are enthusiastic for this arrangement. Of course, where the building site is narrow, the more conventional placing of the garage at the back of the lot is the thing. Below we present a good design of this type with an attractive lattice screen in connection. A study of the floor plan will show the many good features of this English cottage home and the color sketch to left illustrates the interesting features of the downstairs bedroom.

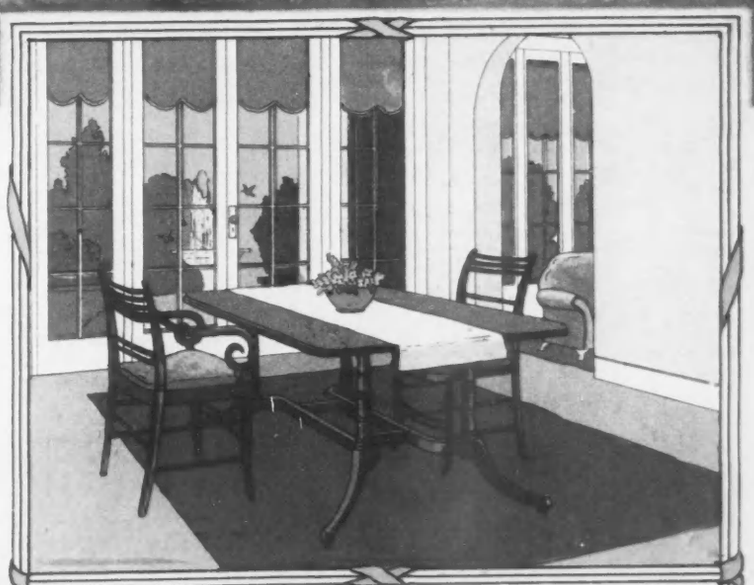


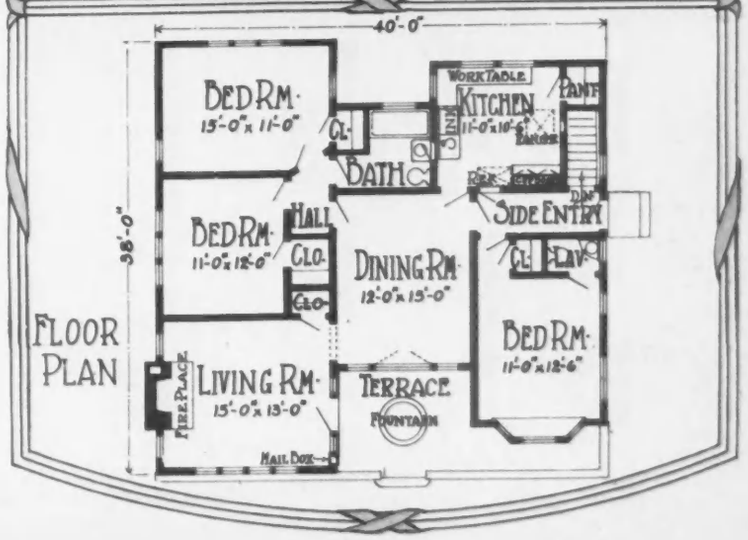


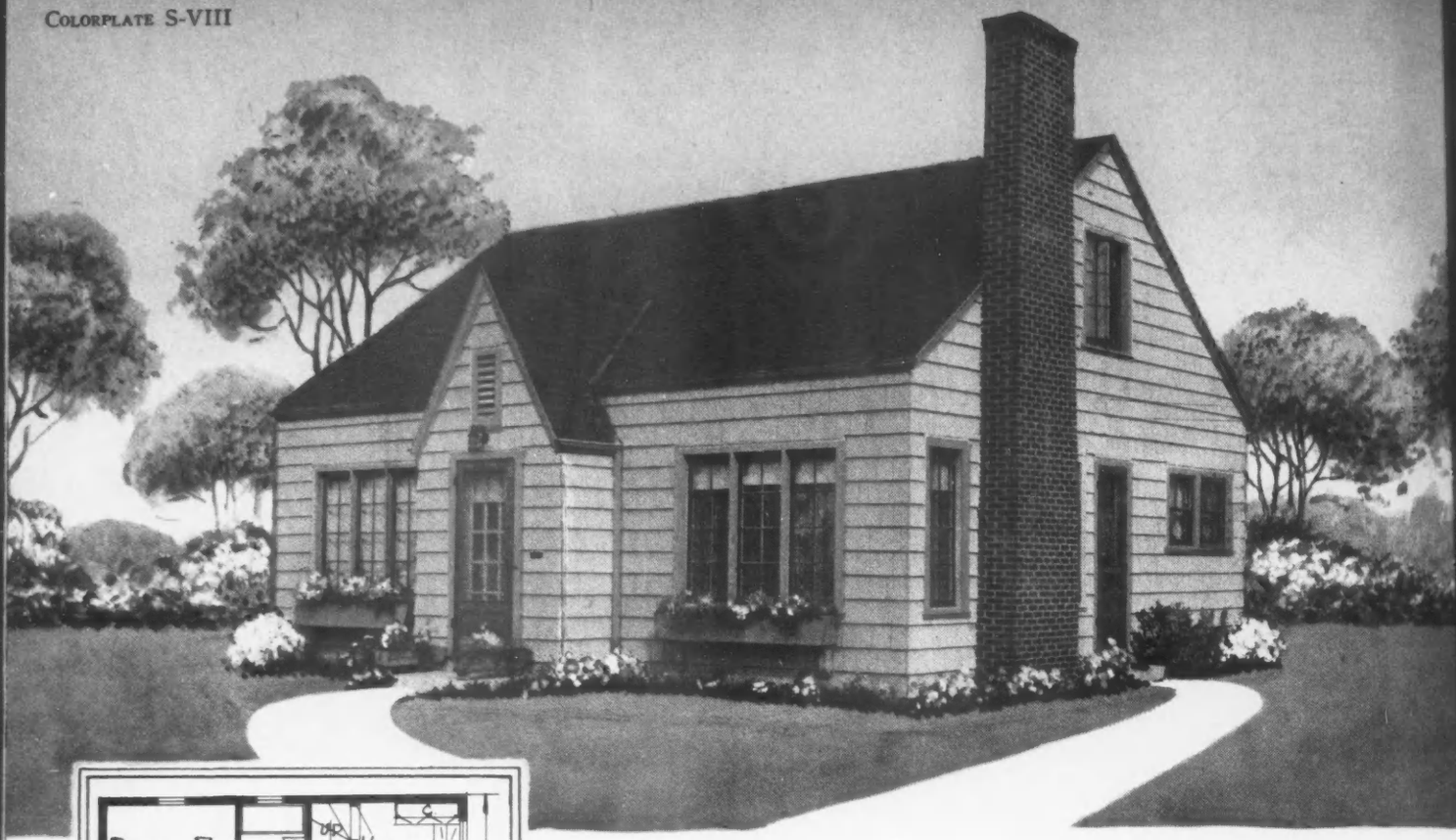
The SAN SOUCI

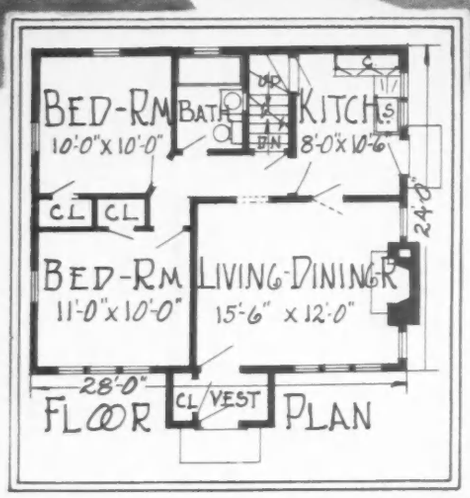
A BUNGALOW of Elizabethan lines containing six rooms. The front porch is a cemented terrace with a fountain, a very interesting feature viewed from both living room and dining room. The three bedrooms are arranged in two groups; one with large bathroom, the other with a private lavatory. The kitchen is very light, cheerful and convenient. Color sketch to right shows the dining room looking out through the group of French windows to the terrace with its fountain.









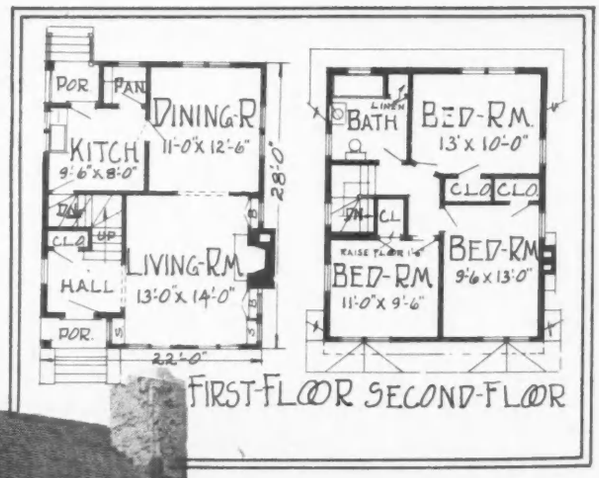


The SANFORD

PHOTOGRAPH above and floor plan to left illustrate a delightful four-room Colonial cottage. Two bedrooms and bath, kitchen and combined living room, dining room.

The SANDUSKY

BELOW and to the right is illustrated a narrow lot Colonial home 22x28 feet containing six rooms and bath.

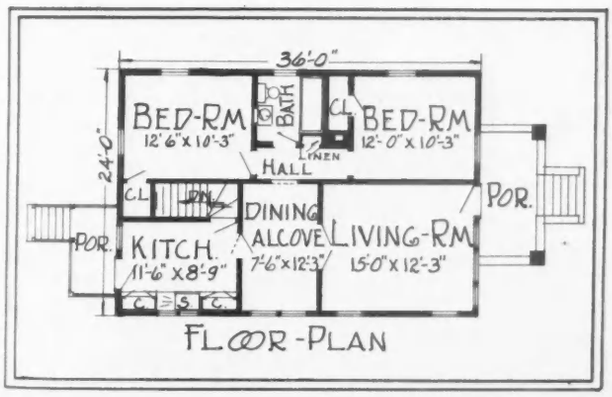




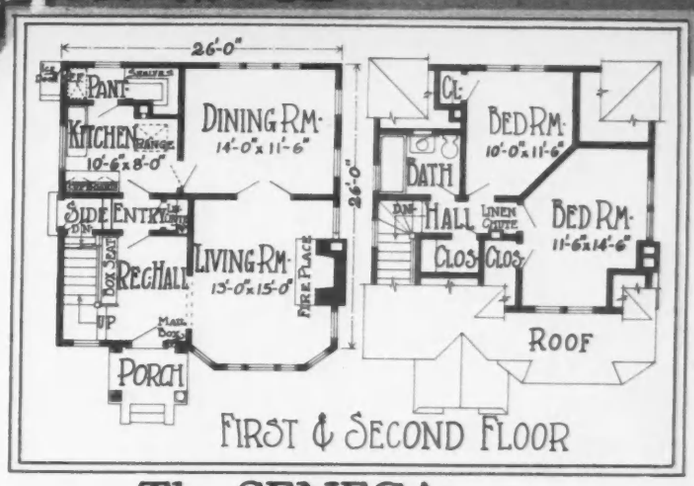


The SEASIDE

ABOVE and to the right is illustrated a clever little shingled home, 26 feet square containing five rooms and bath. A generous amount of closet space is provided.



FLOOR-PLAN



FIRST & SECOND FLOOR

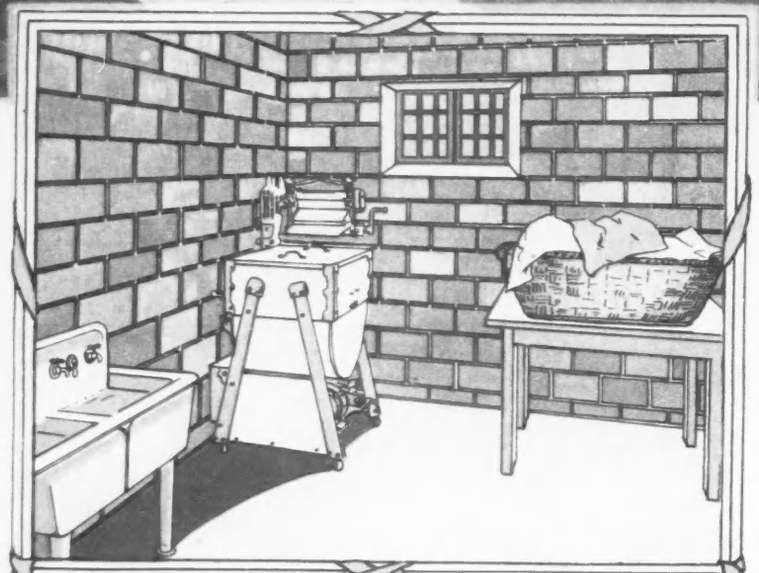
The SENECA

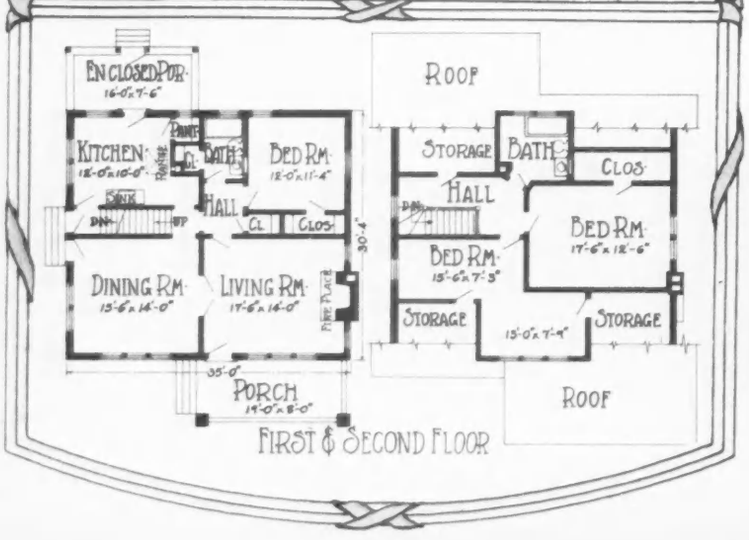
BELOW and to the left is illustrated a practical narrow lot cottage of five rooms and bath.



COLORPLATE S-X

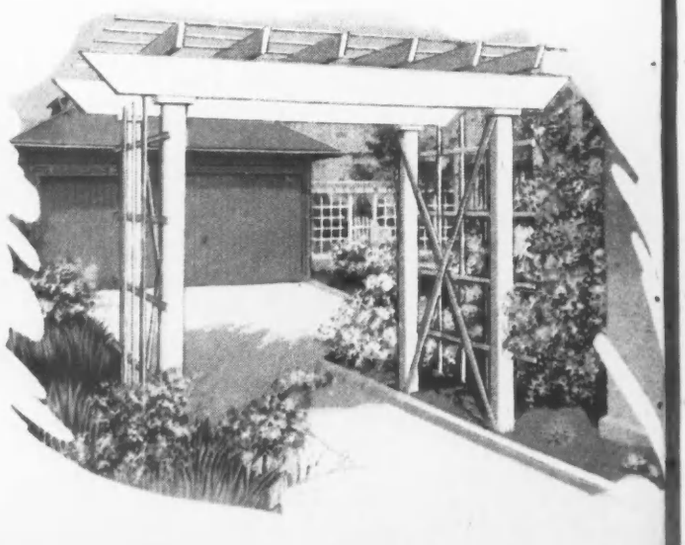






The SAINT CHARLES

HERE is an attractive bungalow of giant size bricks having a vitrified wire cut surface. These hollow tile make a complete wall in themselves, needing no exterior stucco nor inside furring before the plaster is applied. This six-room home with many conveniences has been built at a surprisingly low cost. The color sketch to left illustrates the basement laundry in this home and shows the smooth, sanitary, impervious wall obtained by using these glazed building tiles.



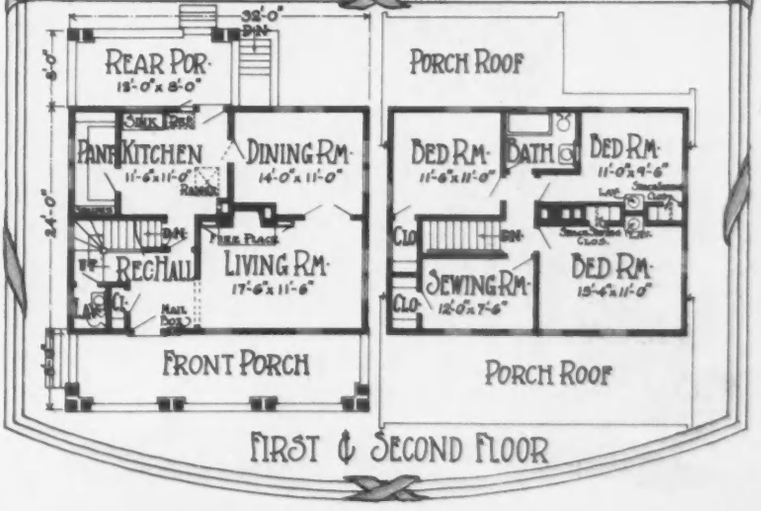


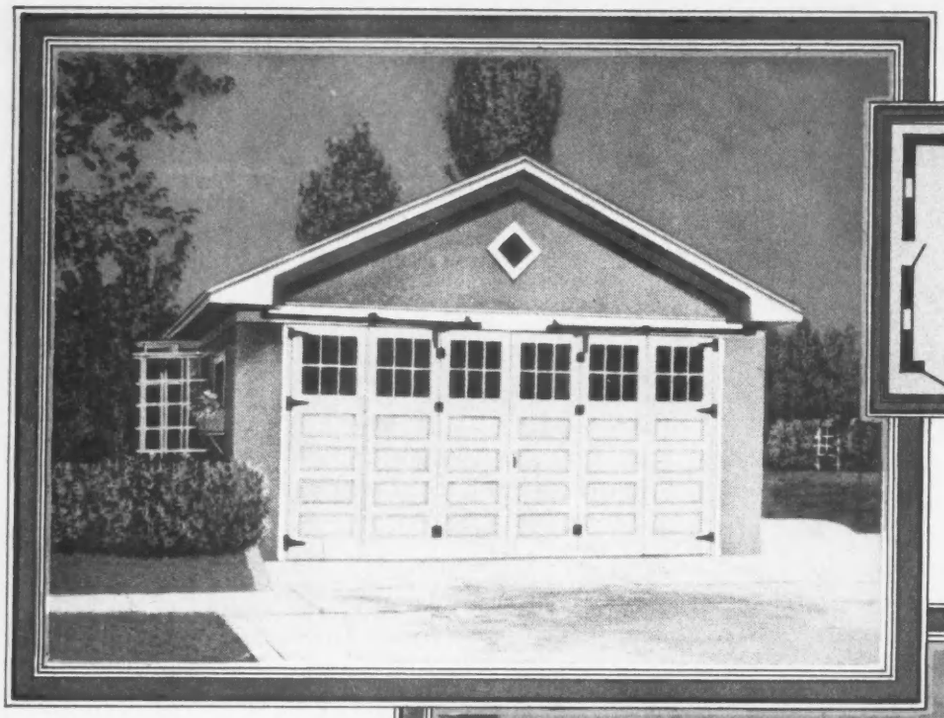
The SANTA ROSA

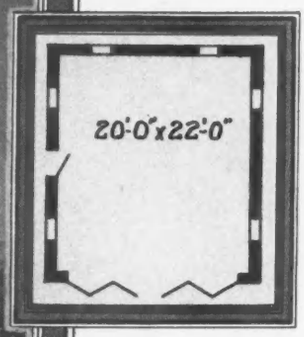
A DUTCH Colonial design with large covered front porch and a corresponding rear porch to balance the roof lines. Seven well-arranged rooms are contained and an interesting feature is the generous number of built-in lavatories on both first and second floors in addition to the bathroom opening off the hall. Another improvement, now much in demand, is the built-in mail box near the front door. Color sketch to right shows how one of the bedrooms is furnished.





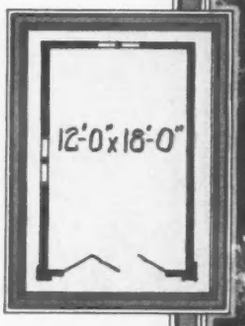


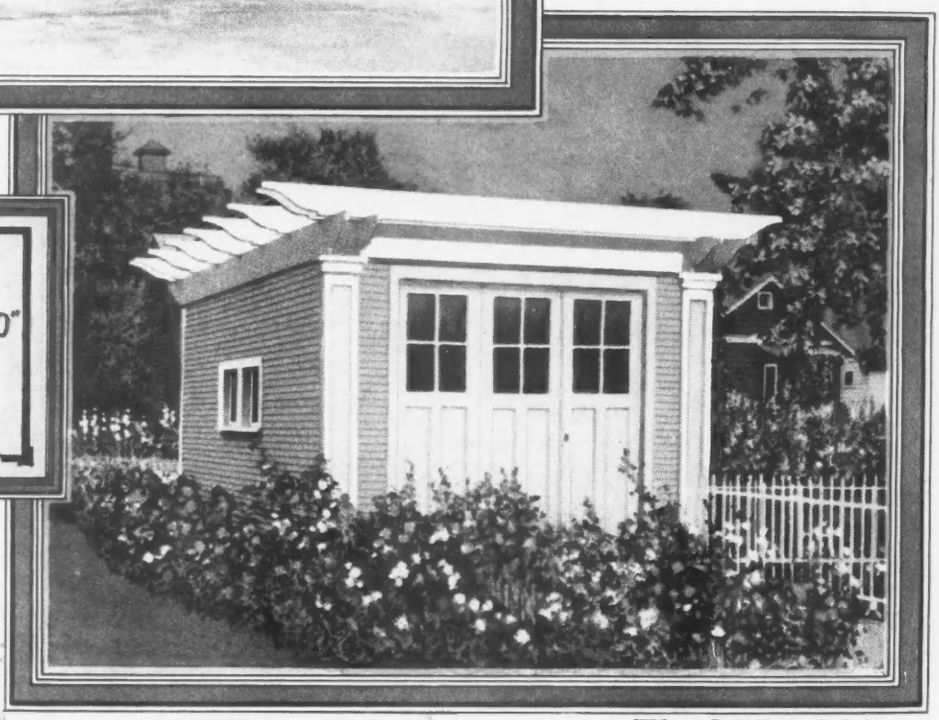




The SAGINAW GARAGE

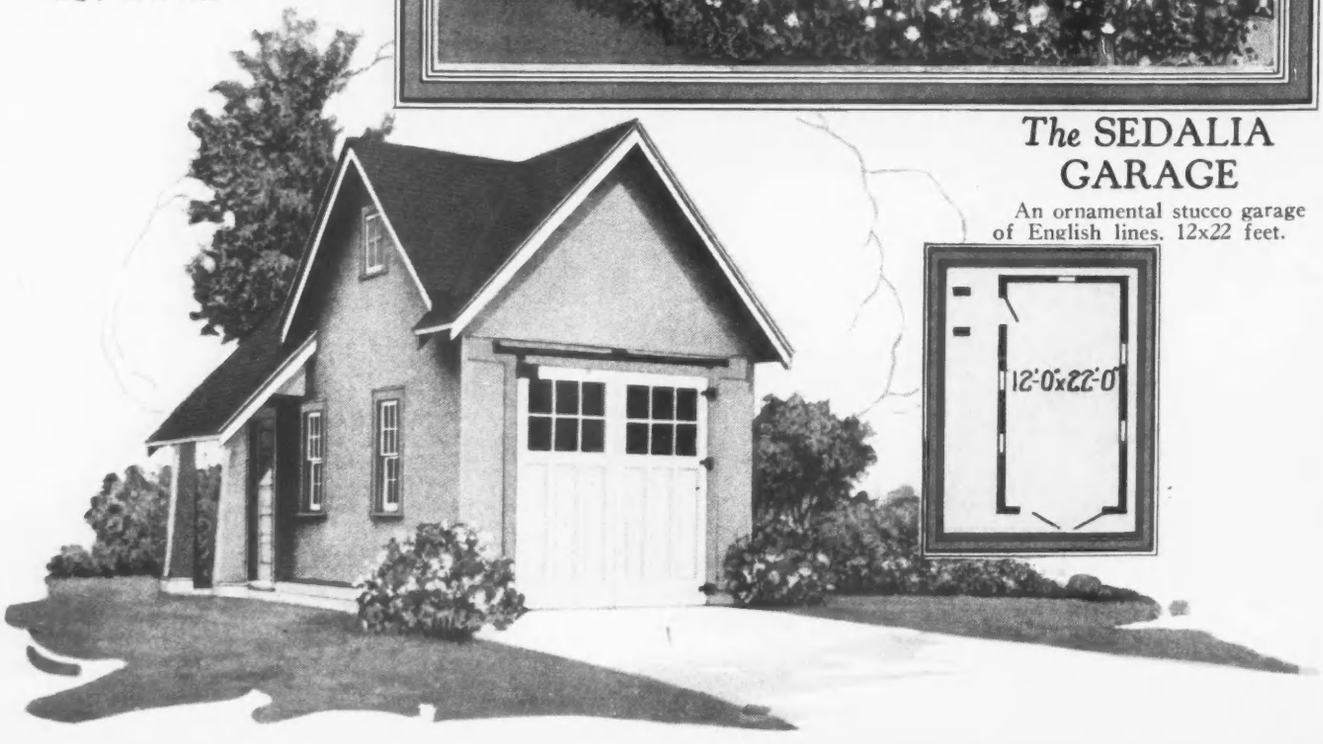
Size 20x22 feet for two cars.





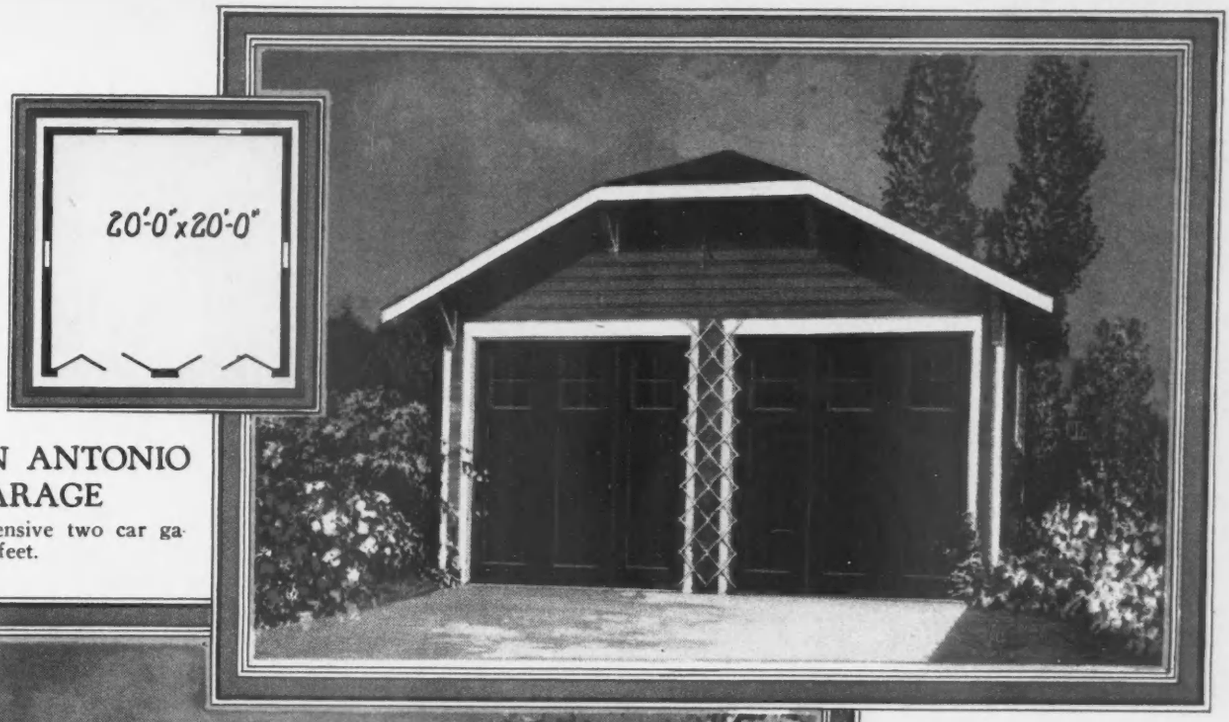
The SALERNO GARAGE

A pergola roof, one car garage, 12x18 feet.



The SEDALIA GARAGE

An ornamental stucco garage of English lines, 12x22 feet.



The SAN ANTONIO GARAGE

An inexpensive two car garage, 20x20 feet.



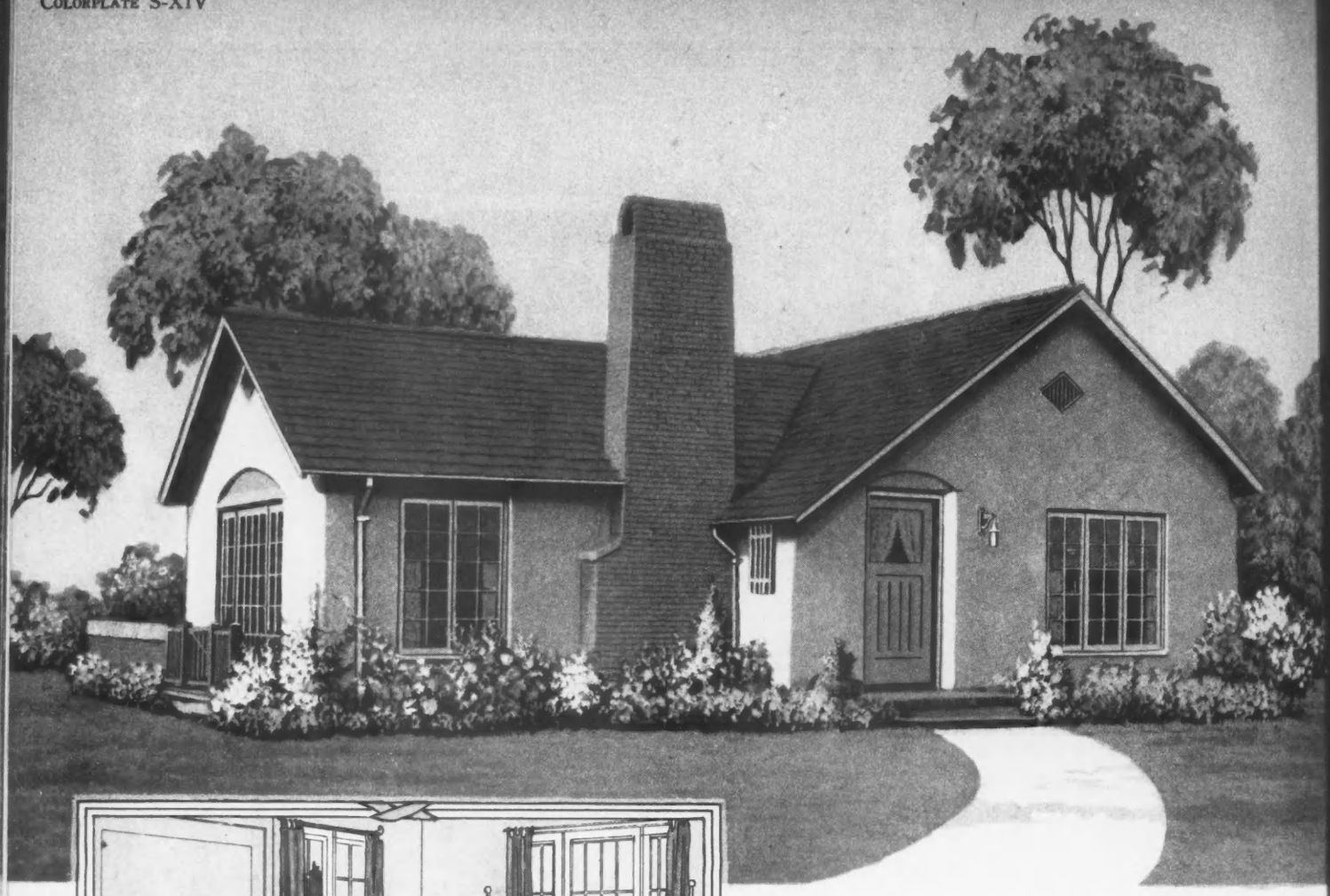
The SEMINOLE GARAGE

A two car brick garage with pergola entrance, 22x22 feet.

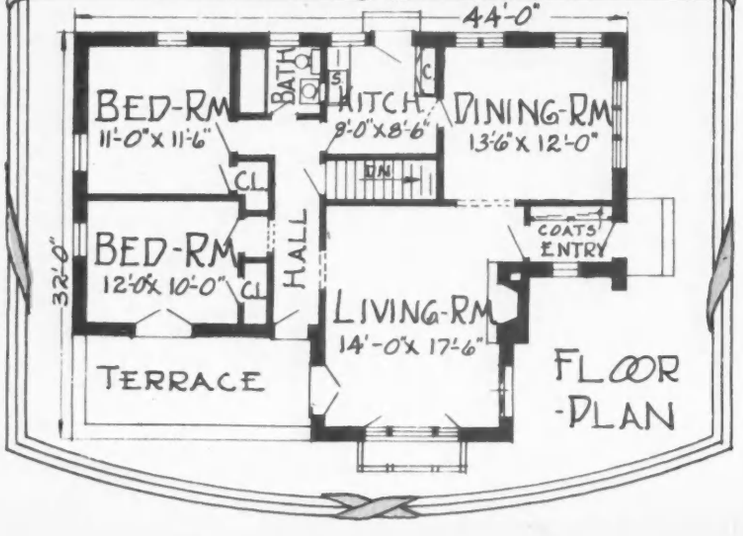
The SAULSBURY GARAGE

Brick and half timber double garage illustrated below





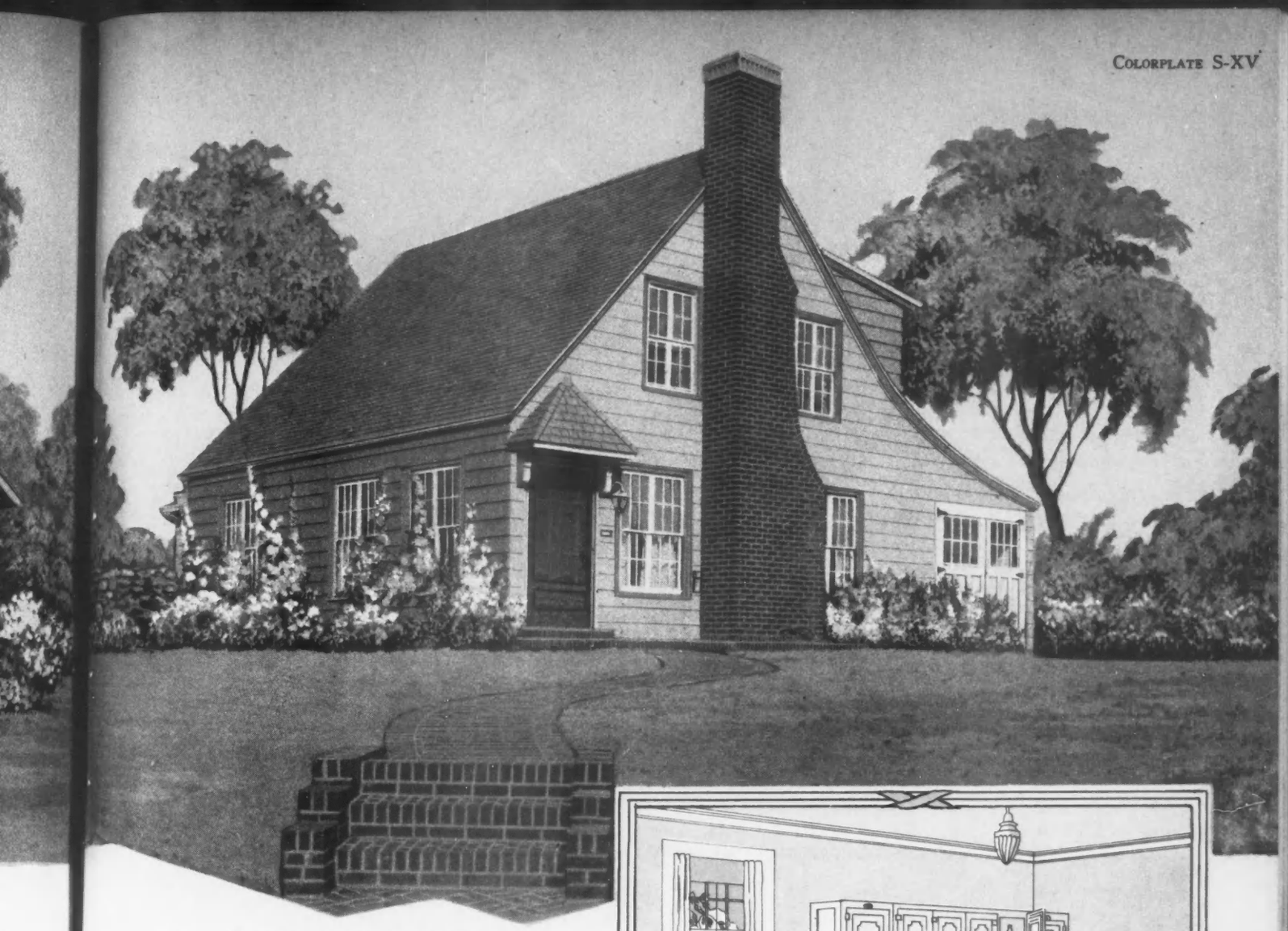




The SELKIRK

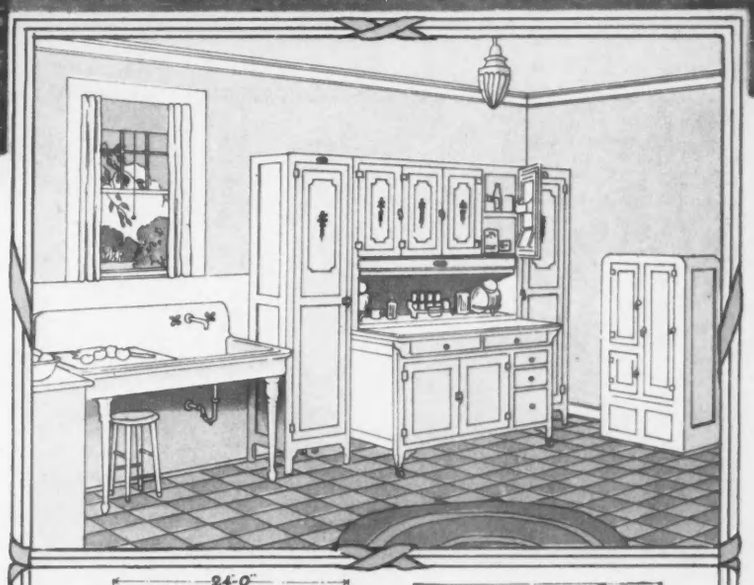
AN English cottage of distinguished lines containing five rooms. The touch of brick work at the entrance step, the big chimney and the wall around the terrace, contrasts vividly with the stucco finished walls; and the picture is appropriately topped by the mottled roof. The big casement windows add to the exterior appearance and make a truly beautiful interior, as you can glimpse in the color sketch to left which shows the fireplace and balcony corner of the living room.

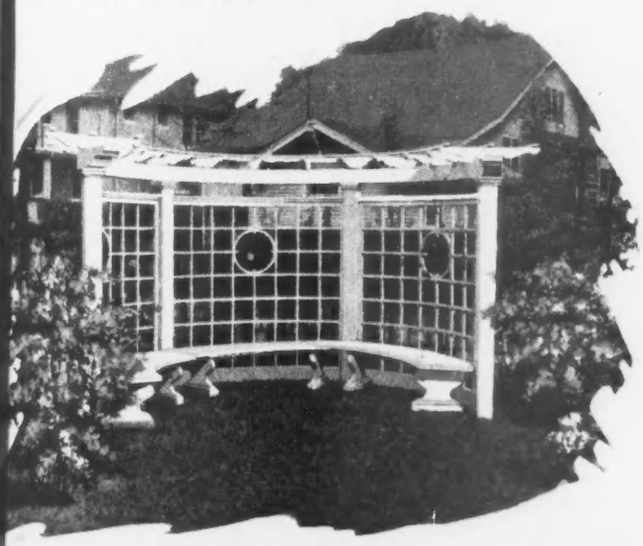


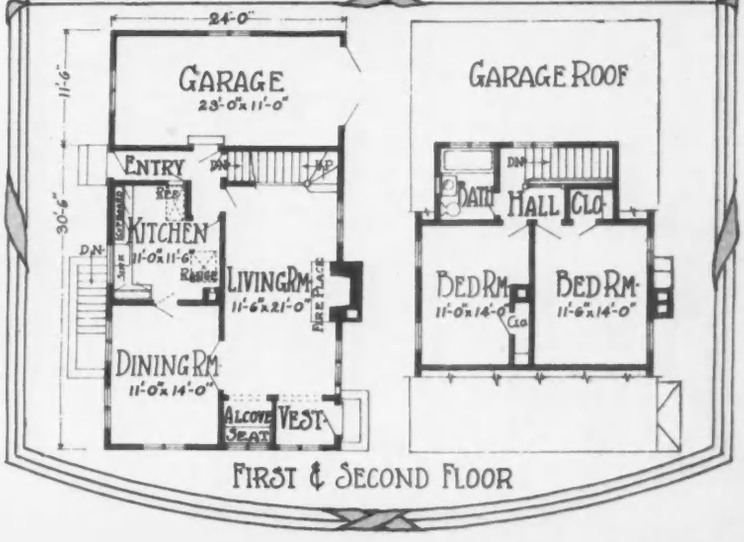


The SHERWOOD

A FIVE-ROOM English cottage with attached garage. The living room is an interesting apartment rather long and narrow with open stairway at one end. Entrance to this room is by way of a semi-enclosed vestibule associated with an alcove with built-in seat. Dining room and kitchen, both of generous size, complete the first floor, while upstairs there are two large bedrooms with bath. The garage is under the same roof of the house and can be entered directly from the back hall. Color sketch to right shows the very interesting and effective combination of kitchen cabinet and accompanying cases which furnish the kitchen and make a separate pantry unnecessary.

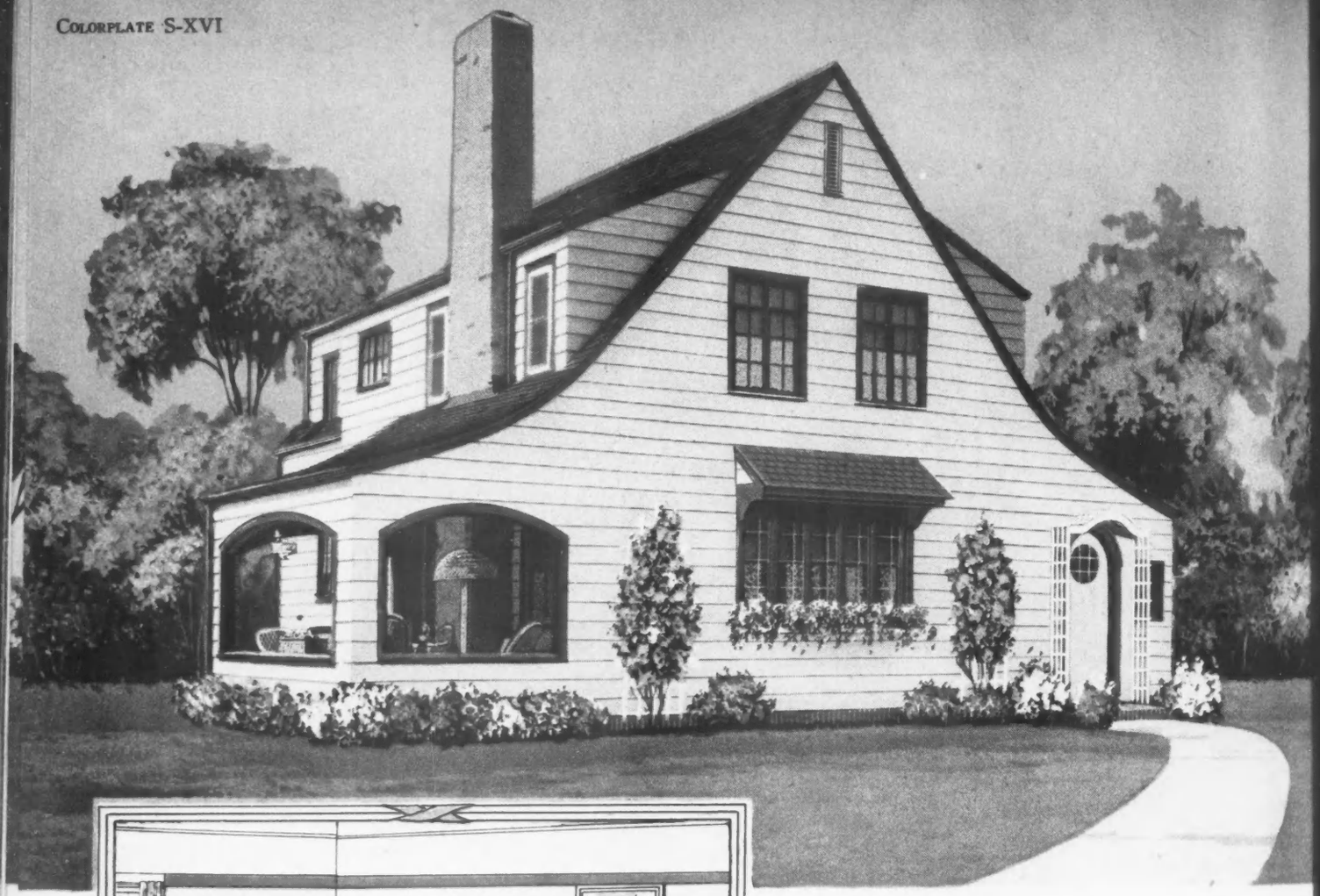


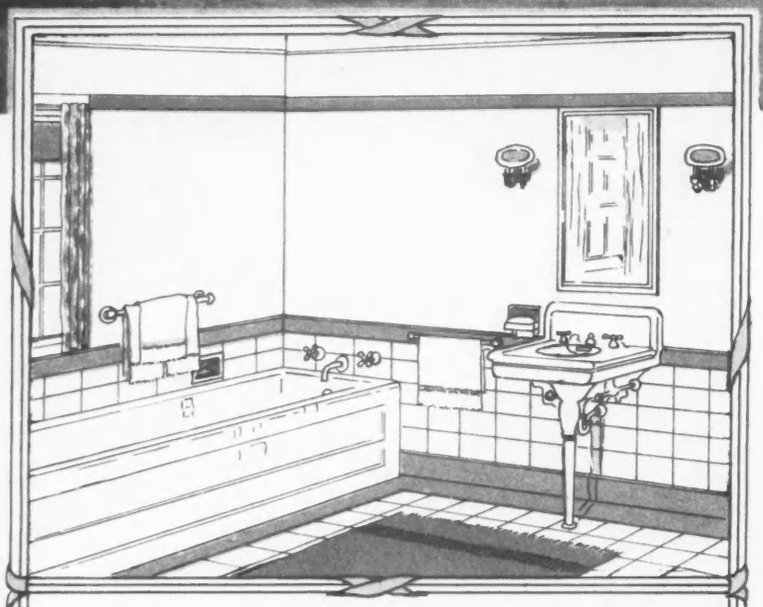




FIRST & SECOND FLOOR

COLORPLATE S-XVI

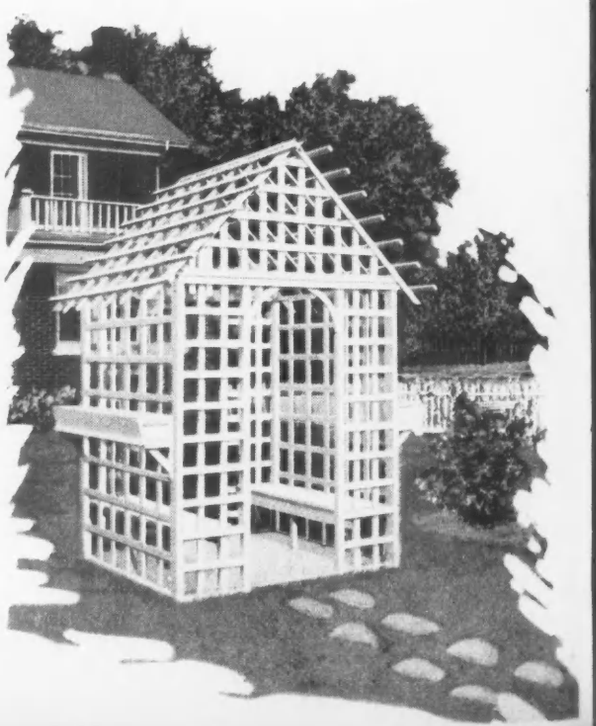


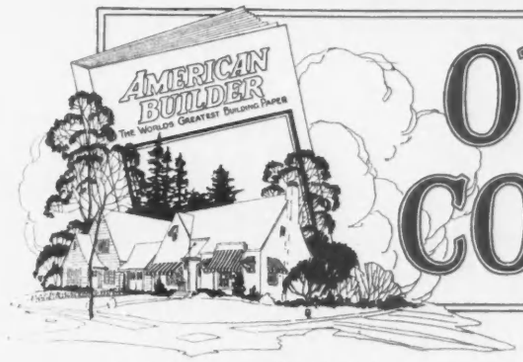




The STEELMAN

A DELIGHTFUL home of English lines that has been found most popular, and accordingly has been recommended to our readers by a prominent lumberman. Study the lines of this home and consult the floor plan diagram below for the fine points of this design. Color sketch to left suggest good modern equipment in plumbing fixtures and accessories for the bathroom.





OUR FRONT COVER HOME

This English Cottage of Seven Rooms Possesses an Individual Charm Based Upon the Best Designing

A MORE charming home could hardly be imagined than the little English cottage pictured on this page and, in colors, on the front cover. It possesses to a marked degree the qualities of individuality, harmony with its setting, correctness of line, well chosen materials and withal an air of cheerfulness, welcome and comfort.

The shingled walls, carried down almost to the grade line, and supported upon a foundation of brick, give that effect of a building which apparently springs from the soil which is so widely desired. The long sweeping lines of roof aid in this effect but are well broken by chimney, dormer and gable. The entrance detail, with the lantern light above, is well developed and the gated doorway at the right adds a piquant touch of interest.

Within, Our Front Cover Home displays these same characteristics. The winding driveway leads around the house to a garage built into the basement and accessible from the inside.

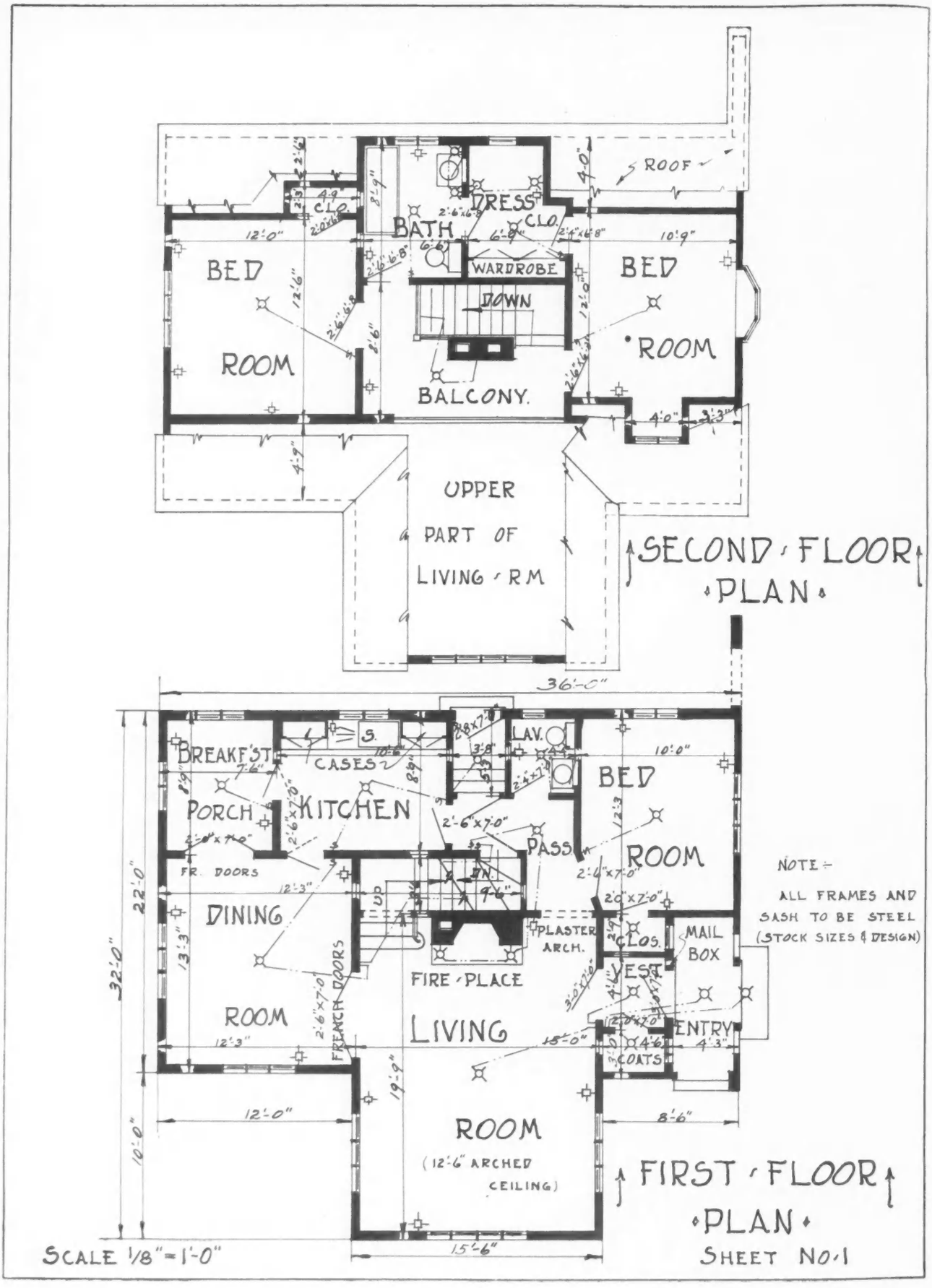
Under the gable roof is a large living room, with a 12½-foot arched ceiling. It is entered through a vestibule. At one end are broad windows admitting a flood of sunlight and affording a view in three directions. At the other end is the fireplace. Set beneath a balcony it possesses a remarkable air of coziness which will make the prospect of long cold winter evenings anything but bleak.

At one side the dining room opens off the living room while beyond it are an attractive little breakfast porch and the kitchen. At the other side is a bedroom with a convenient lavatory beside it.

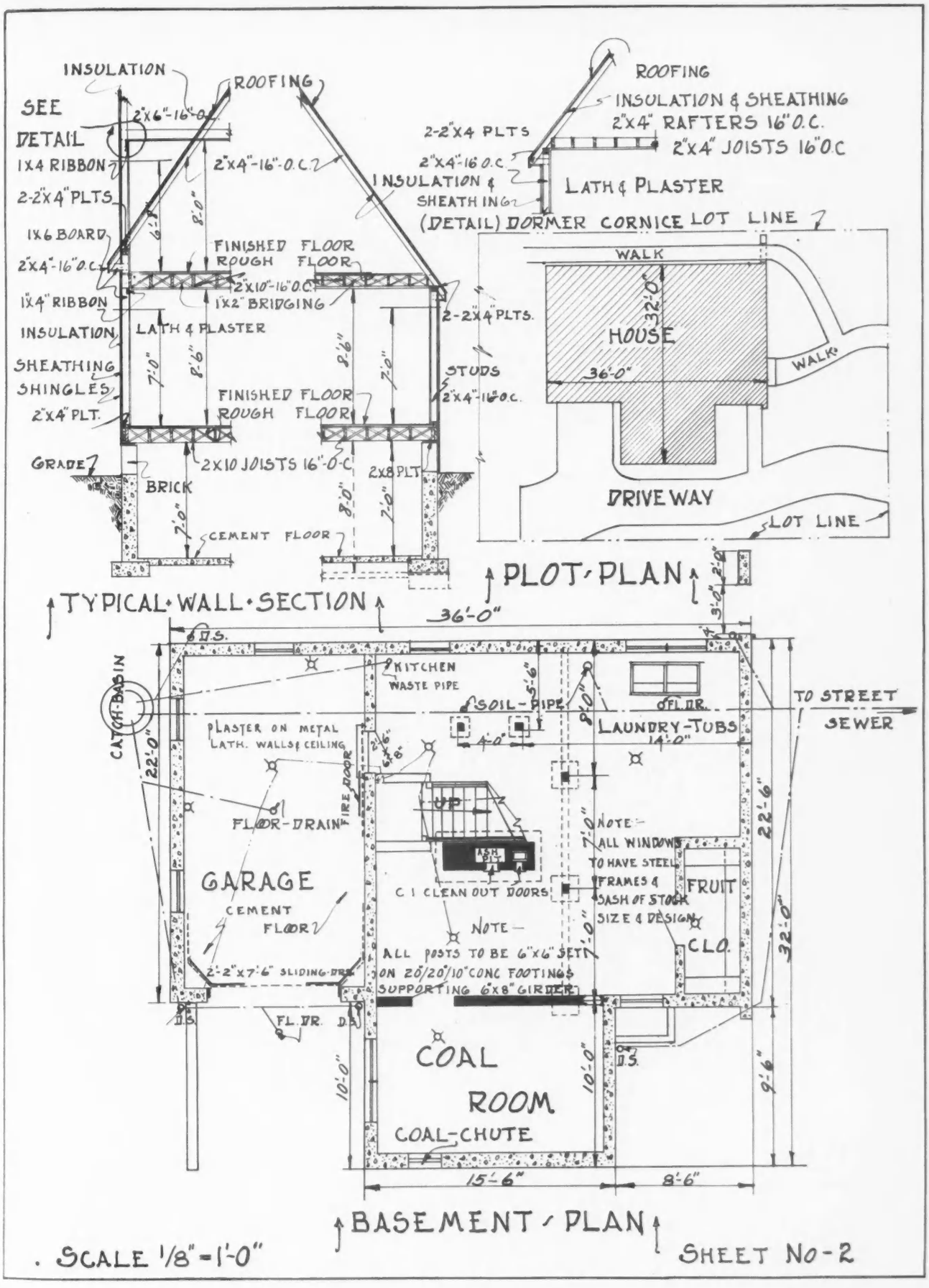
The stairway rises beside the fireplace, leading to the balcony which overlooks the living room and serves as a second floor hall.



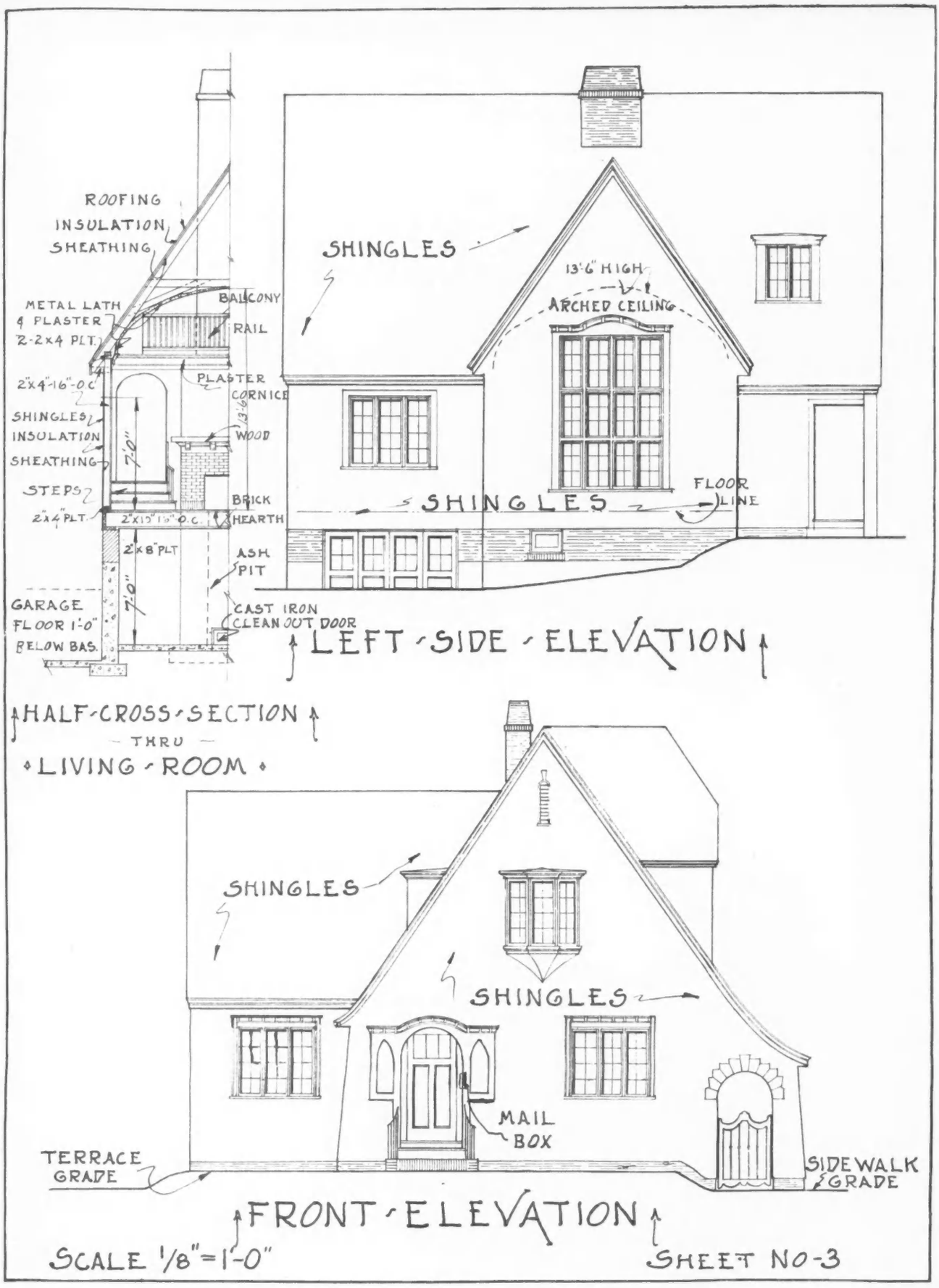
The Popular English Cottage Style Has Furnished the Basis for the Design of Our Front Cover Home, a House Which Anyone Might Be Proud to Own. Its plans, elevations and details are shown on the pages which follow.



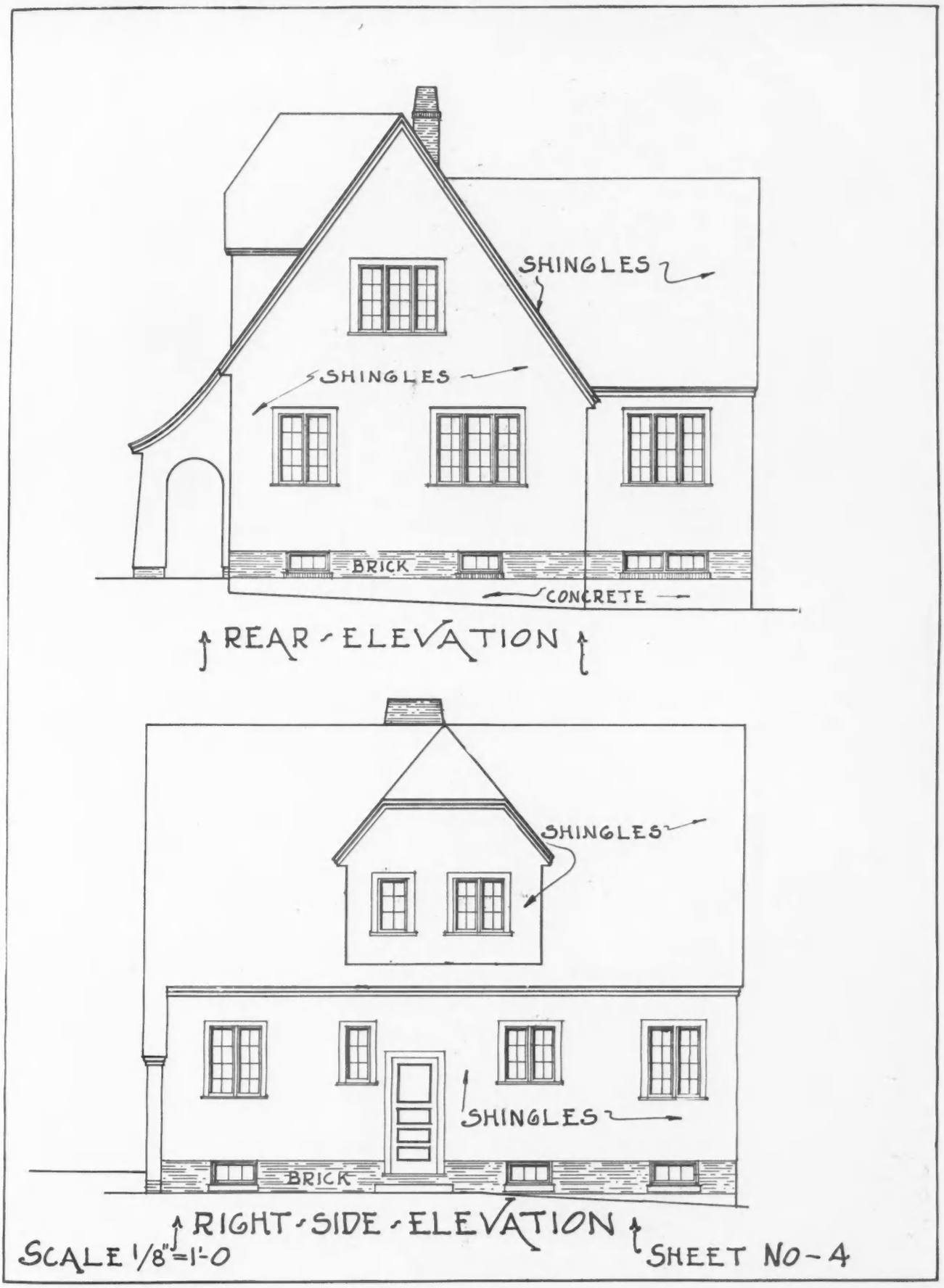
The Floor Plans of Our Front Cover Home Are Drawn About the Spacious Living Room with Its High Arched Ceiling, Cozy Fireplace and Attractive Balcony Which Serves as Second Floor Hall.



A Garage Is Built into the Basement in a Most Convenient Fashion, Being Accessible Without Going Outside the House. Above are details of wall and roof while on succeeding pages are the elevation drawings.

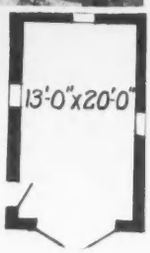


Left and Front Elevations of Our Front Cover Home Show the Relation of Garage to Grade Line, the Arch of the Living Room Ceiling and the Treatment of Entrance and Gateway.

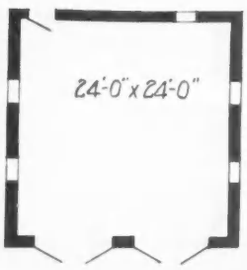


The Rear and Right Side Elevations Complete the Drawings Which Tell the Story of Construction of the Interesting English Cottage Which Is Our Front Cover Home This Month.

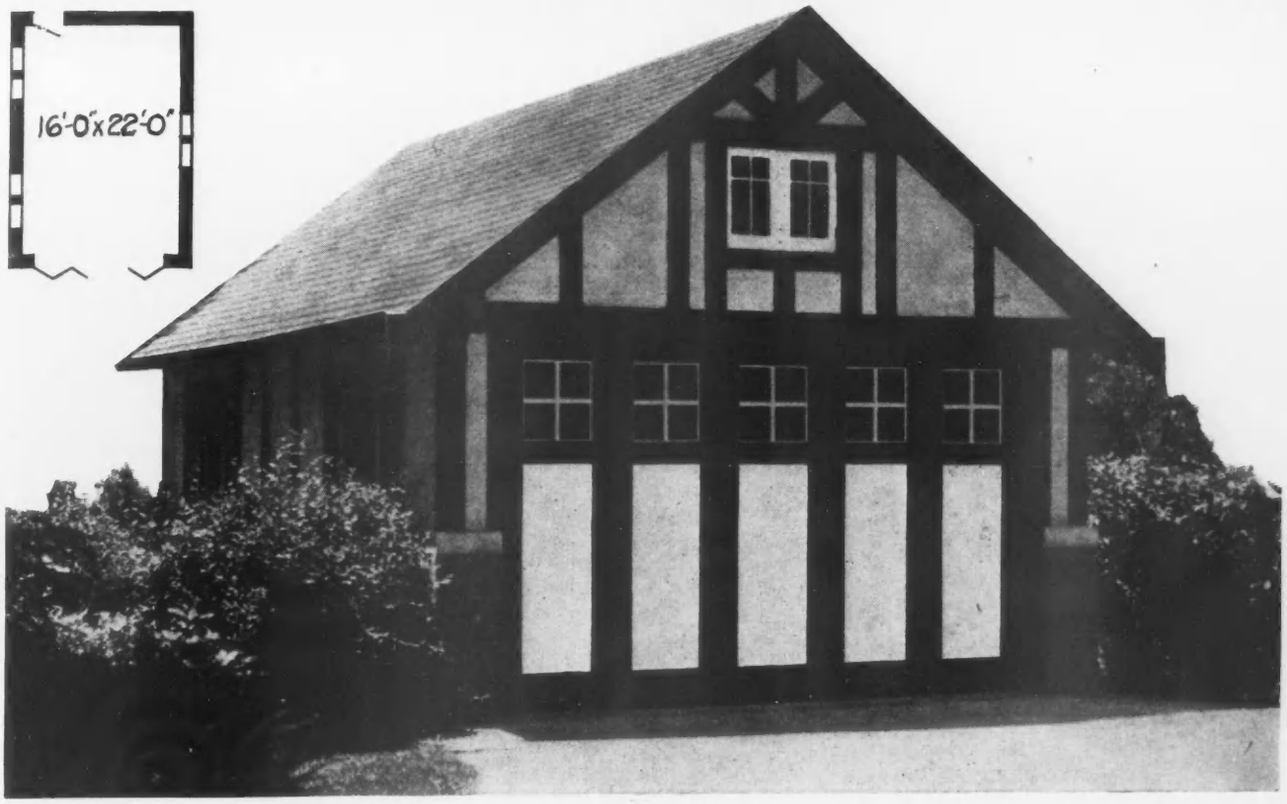




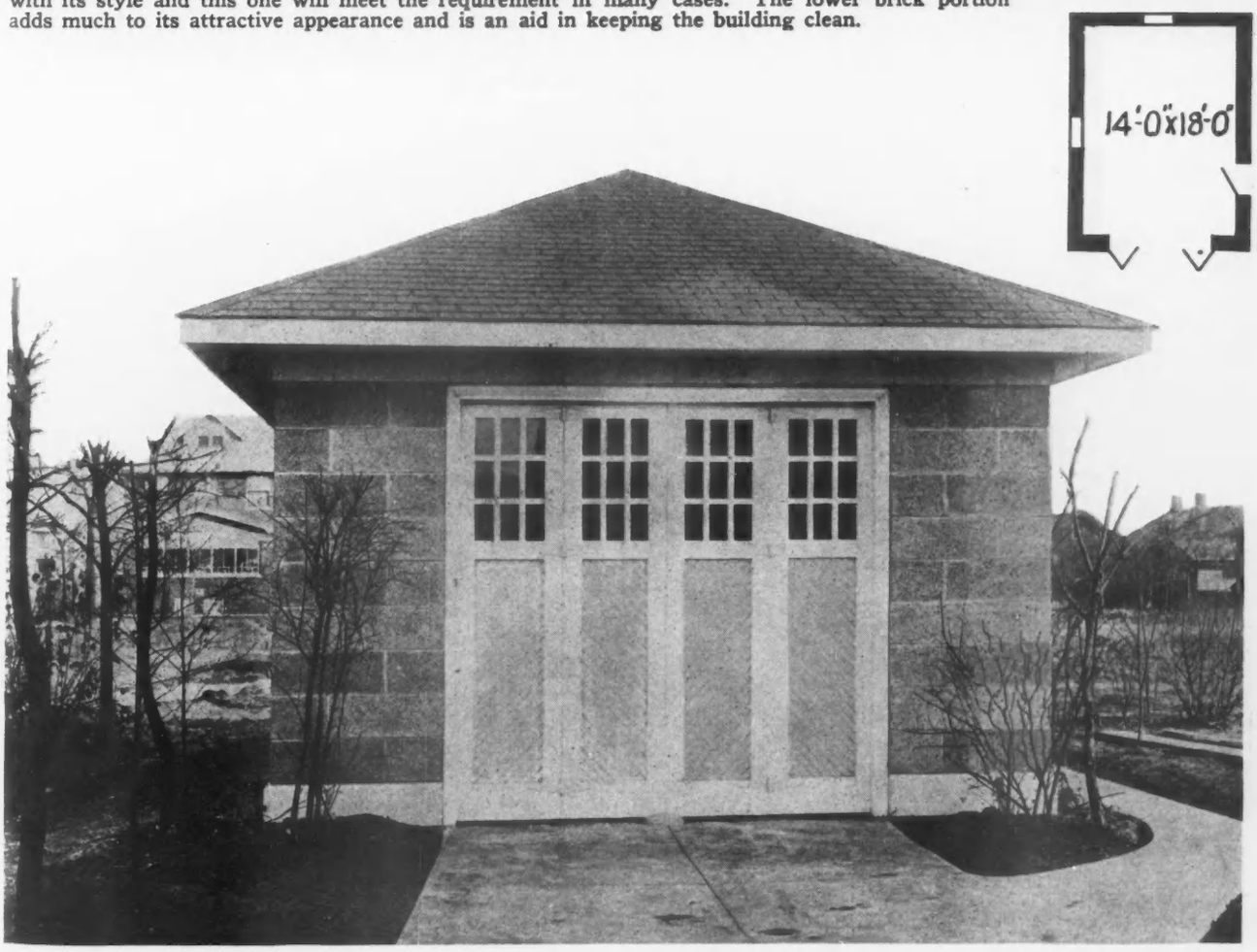
THE SAMPSON GARAGE—Plain brick walls are always good and when the grade line is broken by planting a few sturdy bushes they acquire additional charm with each passing year. Here shingles in the gable ends are an effective break of solid brick expanse.



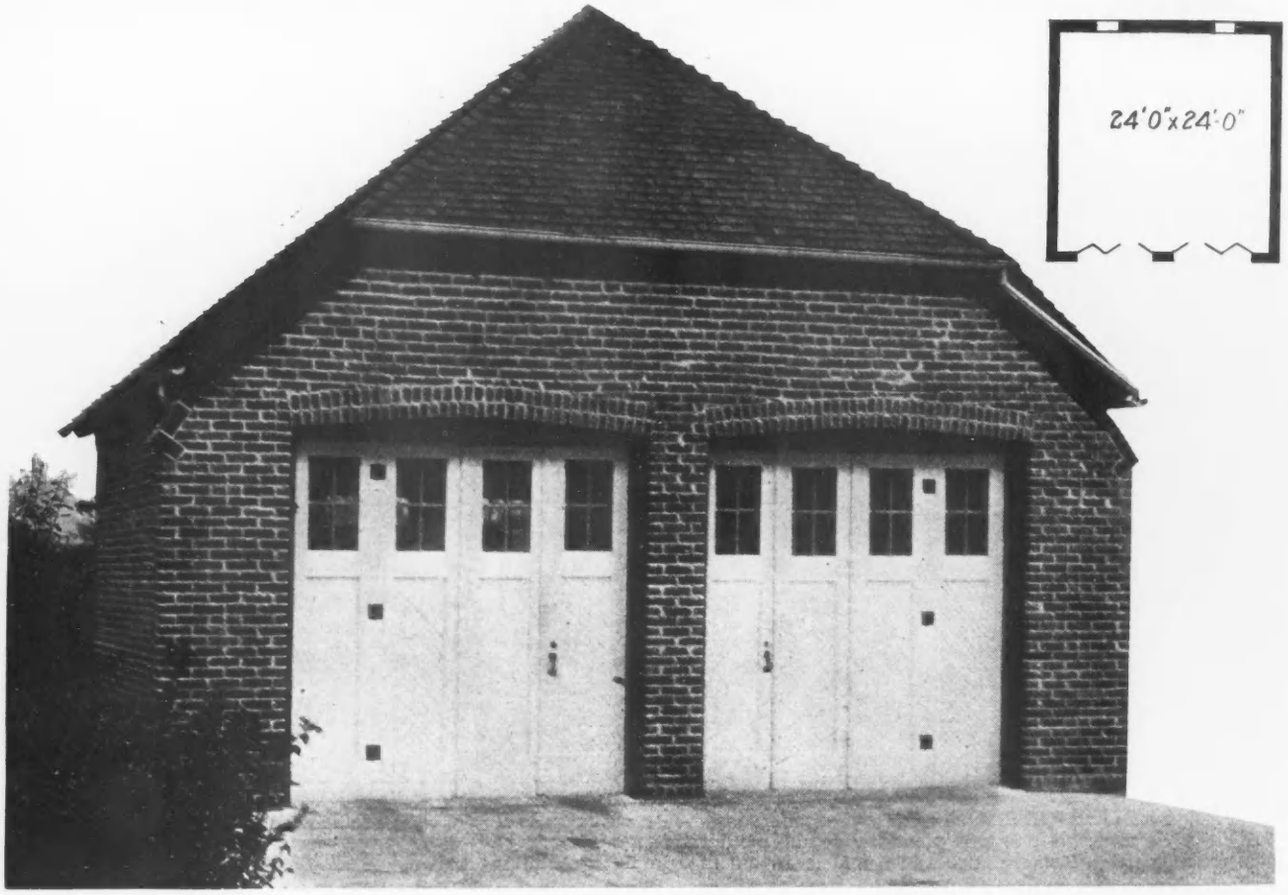
THE SANBORN GARAGE—For the larger home which is strong enough to dominate the picture, this garage is highly desirable. In fact, it is good looking enough to be acceptable for a small family home instead of as a home for automobiles.



THE SADLER GARAGE—The half-timbered home demands a garage which will harmonize with its style and this one will meet the requirement in many cases. The lower brick portion adds much to its attractive appearance and is an aid in keeping the building clean.



THE SAFFORD GARAGE—Concrete blocks can well be used in building the garage, especially when the house is of the same construction. It is as well adapted to the small single car garage as to the larger types. Its appearance is always good and has the quality of permanence in a high degree.



THE SECURITY GARAGE—An effect of age has been achieved here which reminds one of certain old Colonial mills still to be seen in the byways of New England, rather than of that most modern of vehicles, the automobile. The slight arch above the doors is a point of vital importance, without it this building would be quite ordinary.



THE SERVICE GARAGE—Just how attractive a garage building can be made is here evidenced in a large, three-car garage in which just as careful attention has been given to design as would be expected in the design of the house. That this is justified is obvious when one realizes that the house and garage form a group which may be badly marred by imperfection in either unit.



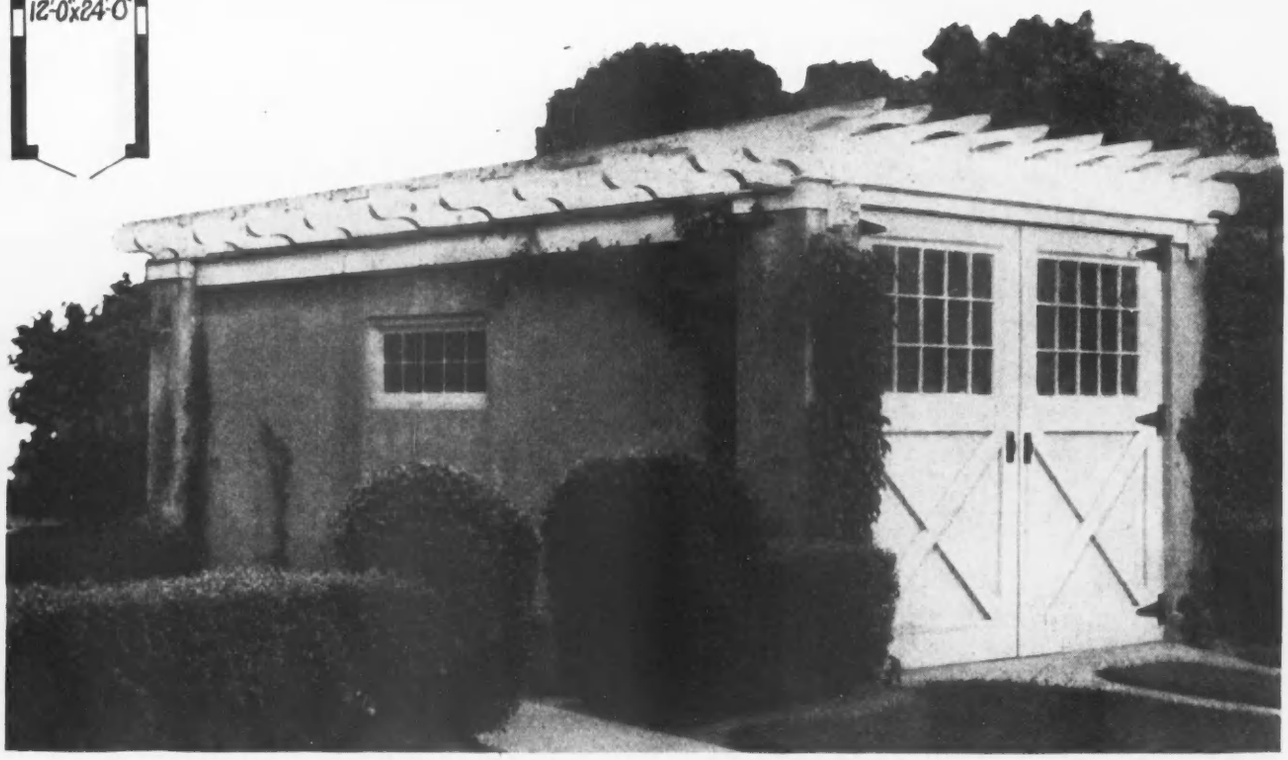
THE SAINT CLAIR GARAGE—Another attractive design, for the larger brick residence, is of brick and shingle construction with a composition shingle used on the roof. It is of a size to provide for housing of two cars and its plentiful lighting will be found a great convenience.



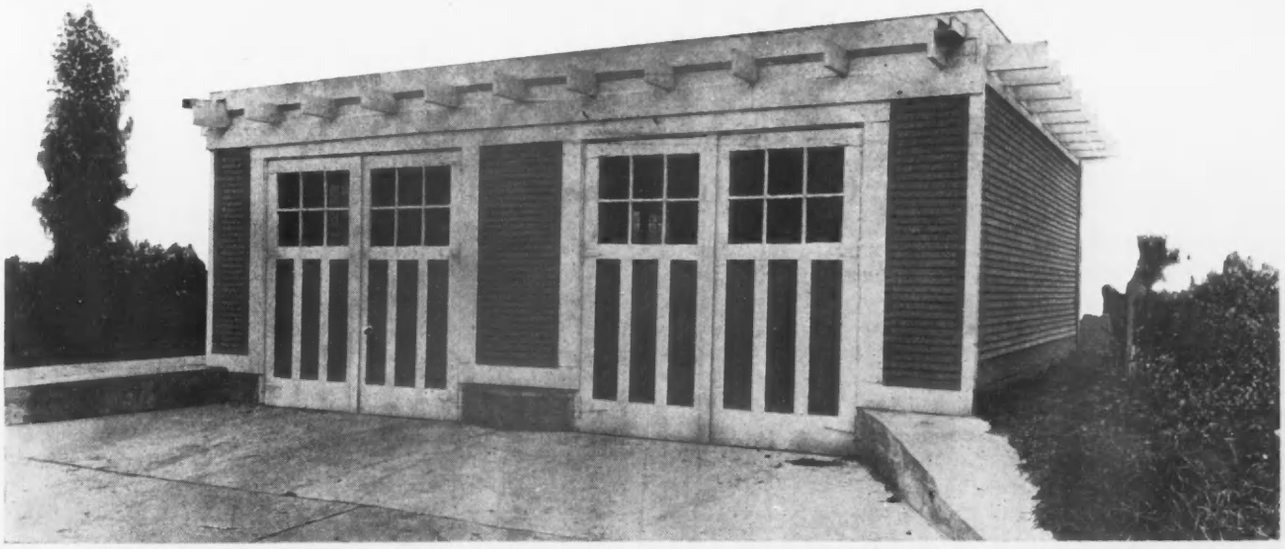
THE PROCTOR GARAGE—A simple frame building intended to house two cars may be made attractive in its very simplicity. When this garage has been provided with a driveway and is surrounded by neat shrubbery the effect will be satisfactory to the eye as well as to the pocket book.



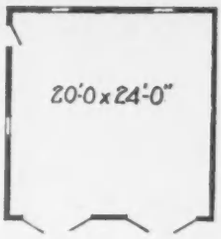
THE SANTA FE GARAGE—A garage like this suggests many possibilities in addition to being a place to keep the cars and an attractive feature of the home site. On the second floor there is sufficient room for living quarters for the chauffeur or a workshop, den or studio may be finished there according to the interests of the owner.

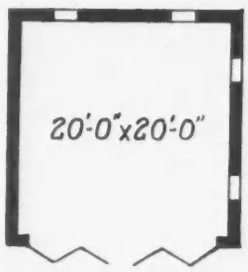


THE SARGENT GARAGE—For the home of Spanish style this little garage would be highly appropriate and it could also be used very well with other types of stucco building. It will be found particularly effective where there is a pergola in connection with the house.



THE SEALY GARAGE—Here is a design with a nearly flat roof, the slope being only sufficient for draining, which has been given an added degree of individuality by projecting rafters which are suggestive of the pergola.





THE SECOR GARAGE—Not only does this garage follow the style of its house, but is attached to it with the appearance of being an actual part of the structure. It is, however, separated from the house structure by a solid wall, which is a requirement under the fire regulations of certain communities.

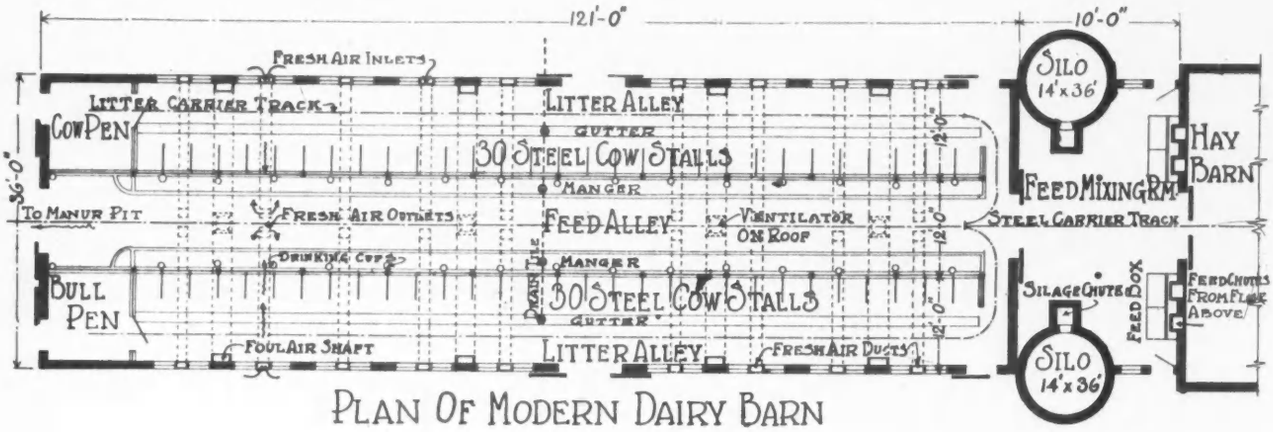
Cow Stable With Attached Hay Barn and Silos

A Well Planned Dairy Group, Built of Tile

THIS one story cow barn with separate but attached hay barn makes an efficient, convenient dairy group, with a central feed mixing room and double silos. Its capacity can be increased at any time by adding wings or extensions. Note the feed alley and overhead conveyor extending from the hay barn, through the feed mixing room and down the middle of the cow barn. Thus, all types of feed—hay, ensilage and grains are reached by the carrier and handled direct to the animals. Note also the ample provision for ventilation, which is all the more effective in the cow stable because the hay is stored in a separate hay barn. Litter from the litter alleys can also be handled on the carrier, the overhead track extending for this purpose out into the stable yard.

This extremely efficient cow stable has walls of hollow, vitrified tile, as have, also, the barn and silos. The salt glaze finish on the outside of this tile is weatherproof and the generous air spaces within the tile act as insulation against both heat and cold, providing very comfortable housing for the cattle.

A feature of the design of this cow stable is the ample light provided through numerous windows on both sides along the litter alleys. It is well known that germs do not thrive in strong light, so that the provision of a great number of windows on the litter alleys is in accordance with the most advanced and scientific dairy farm ideas. Ample ventilation is also provided through the three roof ventilators, foul air shaft and fresh air inlets.



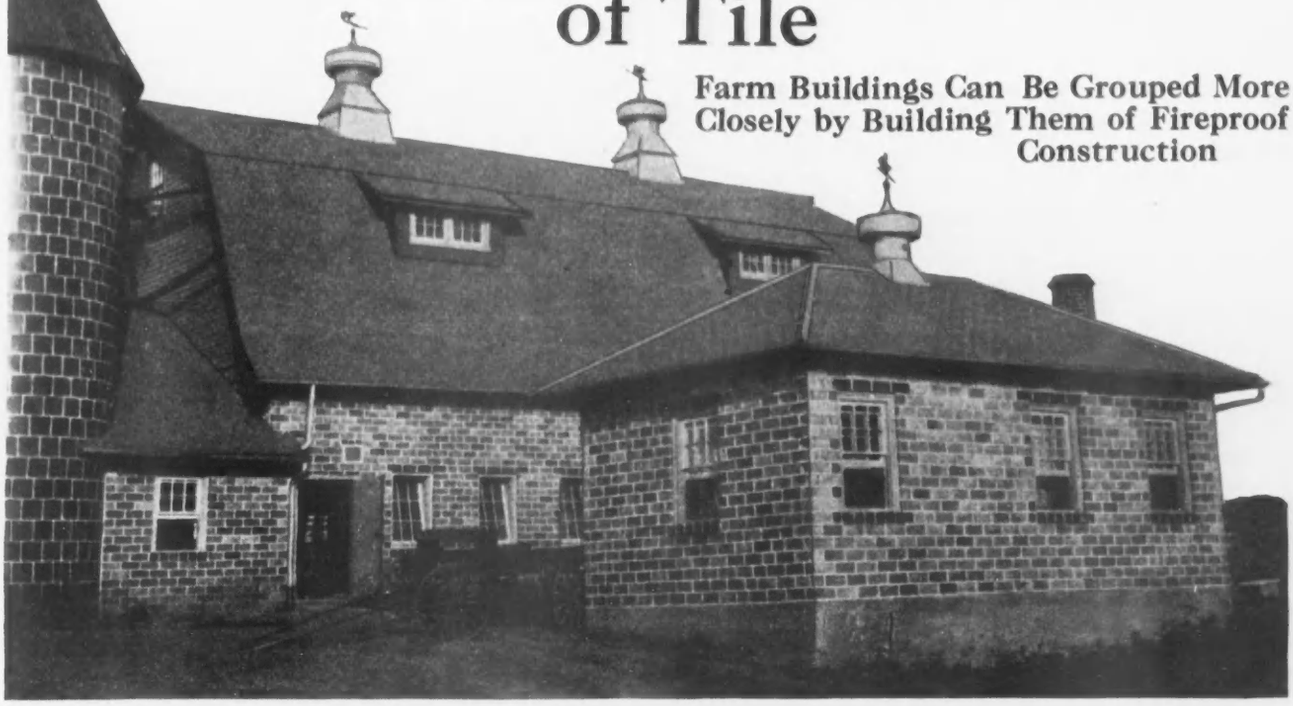
PLAN OF MODERN DAIRY BARN

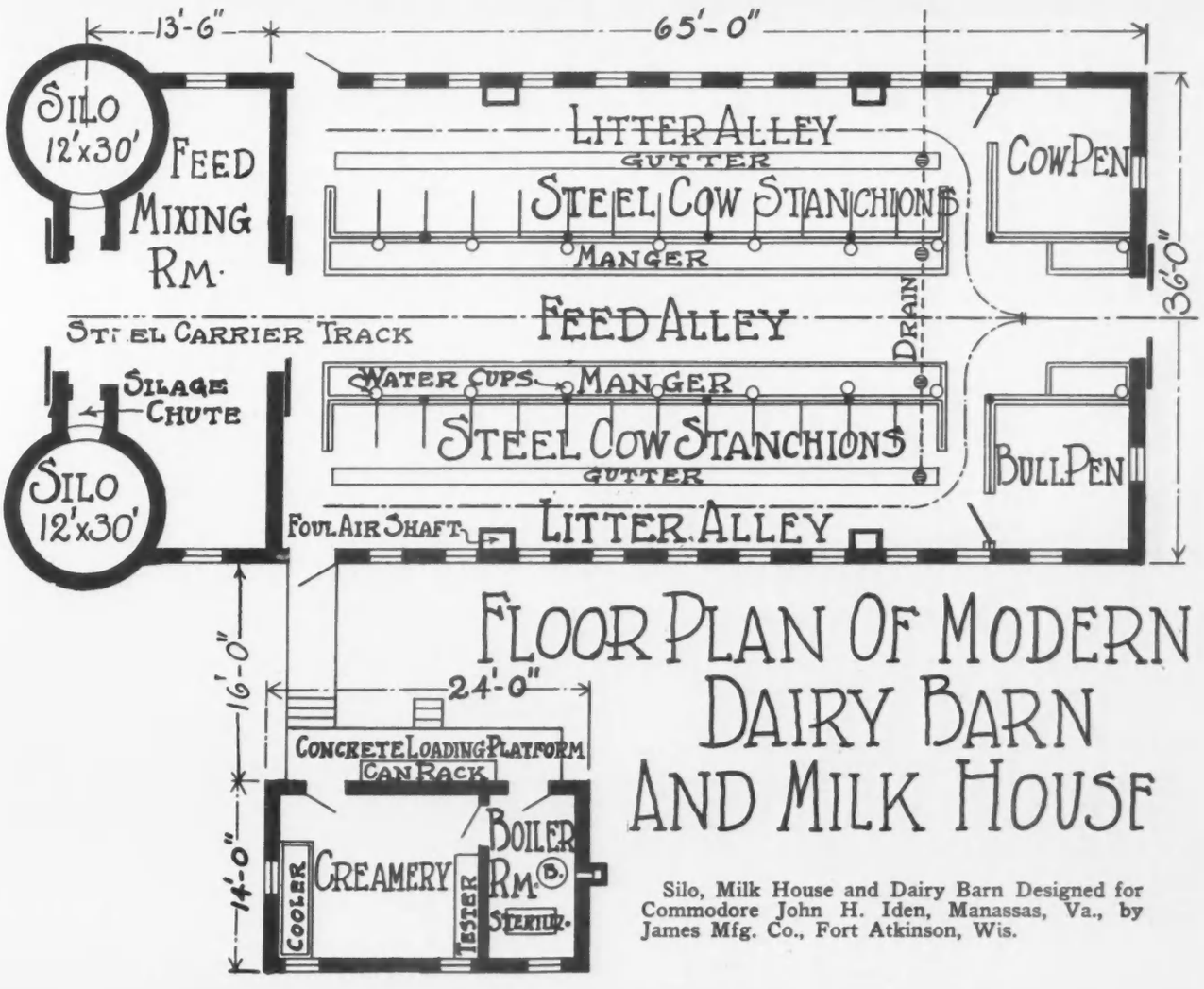


These Are the Cow Stable, Barn and Silos on "Sycamore Farm," Douglasville, Penn.

Dairy Barn and Milk House of Tile

Farm Buildings Can Be Grouped More Closely by Building Them of Fireproof Construction

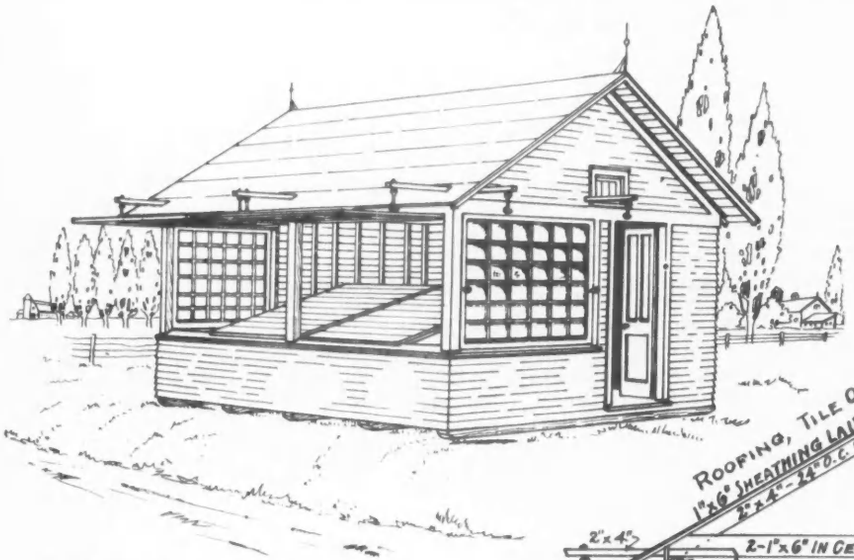




FLOOR PLAN OF MODERN DAIRY BARN AND MILK HOUSE

Silo, Milk House and Dairy Barn Designed for Commodore John H. Iden, Manassas, Va., by James Mfg. Co., Fort Atkinson, Wis.

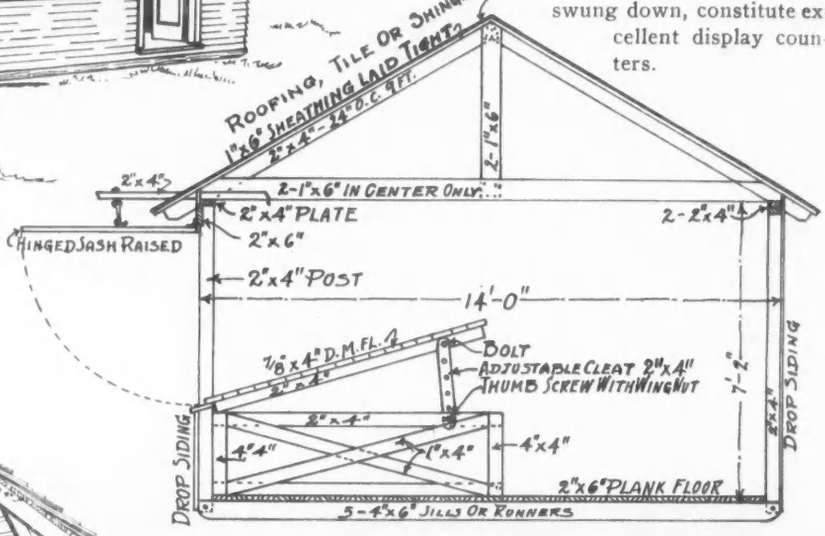
Two Roadside Market Stands



NOW that motor travel is so extensive and highways reach from coast to coast through every state, there is constantly increasing use for highway market booths for the direct retail sale of fruits and vegetables.

The drawings herewith show every detail of construction of two types of booths. The sash of the larger building swing up when open and the four sides of the smaller building are collapsible and, when swung down, constitute excellent display counters.

Above and to Right Are Drawings of a Square, Business-like, Low Cost Booth. Below is a diagram showing construction of the ornamental booth shown in the photo.



Here the Farmers and Fruit Growers Can Display for Sale Their Choicest Products, and Tourists, Travelers and Summer Resorters Can Secure Eggs, Fruit and Vegetables Fresh from the Farms.

Artistic Cemetery Building

While Designed for Cemetery Use, There Are Many Other Locations Where It Would Be Equally Useful

By HERBERT C. CROCKER

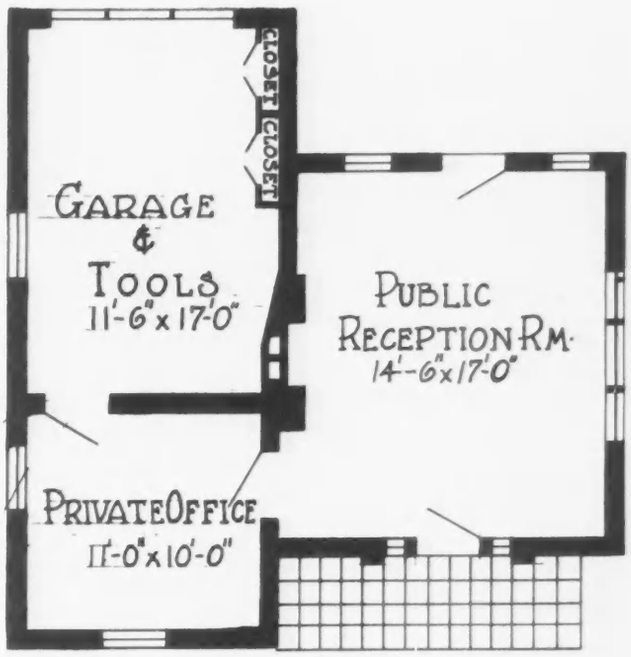
A COMBINATION office and sexton's tool house is shown in the accompanying illustration and plan. This artistic structure was recently erected for a Southern Illinois cemetery association at the nominal cost of $3,500. With a few alterations, the building might easily be used for a community house, rest room or park building. It is substantially built and the upkeep will be nil for many years to come.

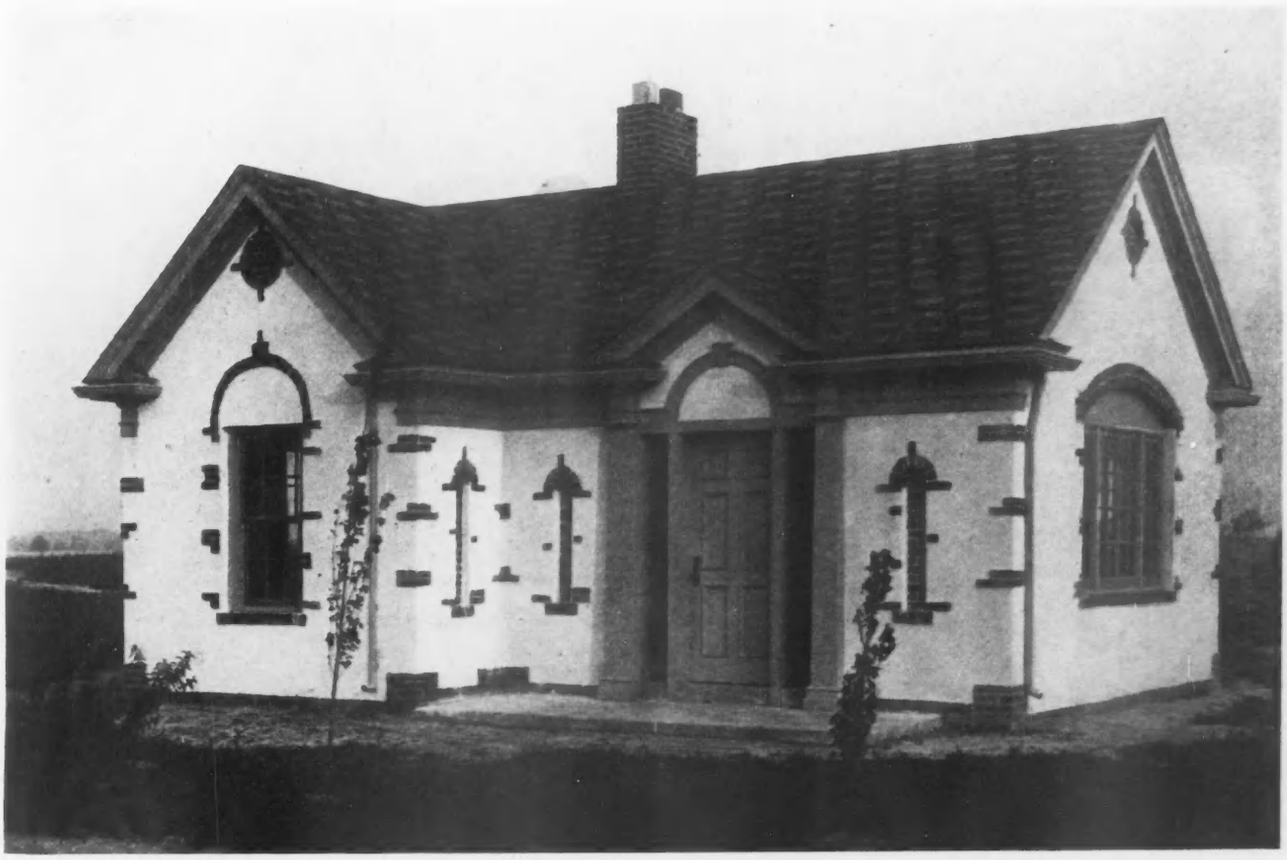
The building is constructed upon a concrete foundation, with one row of brick at the grade line. The walls are of hollow tile, the exterior being covered with stucco. As the construction of the walls progressed, the brick decorations were set in. The vari-colored roof is composed of black and green asphalt shingles.

The building is divided into three rooms. One is a reception room used by the public; another a private office and the third is a garage and tool house.

The public room is 14 feet 6 inches by 17 feet. The monotony of the long inside wall is relieved by an artistic fireplace. One set of triple windows, two other medium sized ones at the rear and glazed spaces at either side of the entrance provide ample light and ventilation.

The private office is 10 by 11 feet. It is simple in every respect. The garage and tool house is 11 feet 6 inches by 17 feet. It is amply large for the storage of tools, wheelbarrows and one truck or automobile.





An Artistic but Inexpensive Cemetery Building as Built for the Sunset Hill Cemetery Association. Plan shows public reception room, private office, garage and tool room. With slight alterations, the design would be suitable for a park or community building.

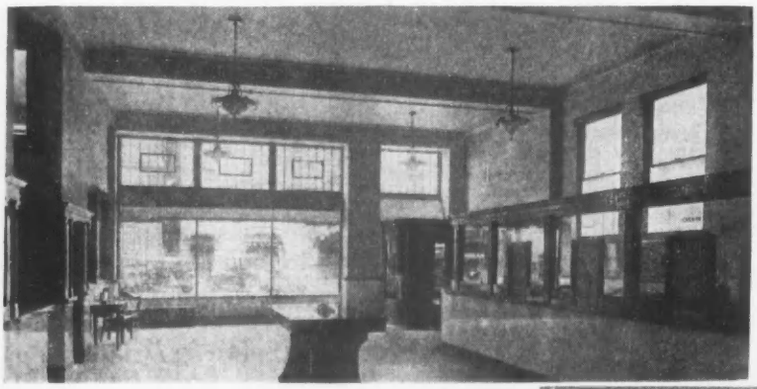
Fine Public Service Building Designed for Erie Lighting Co.

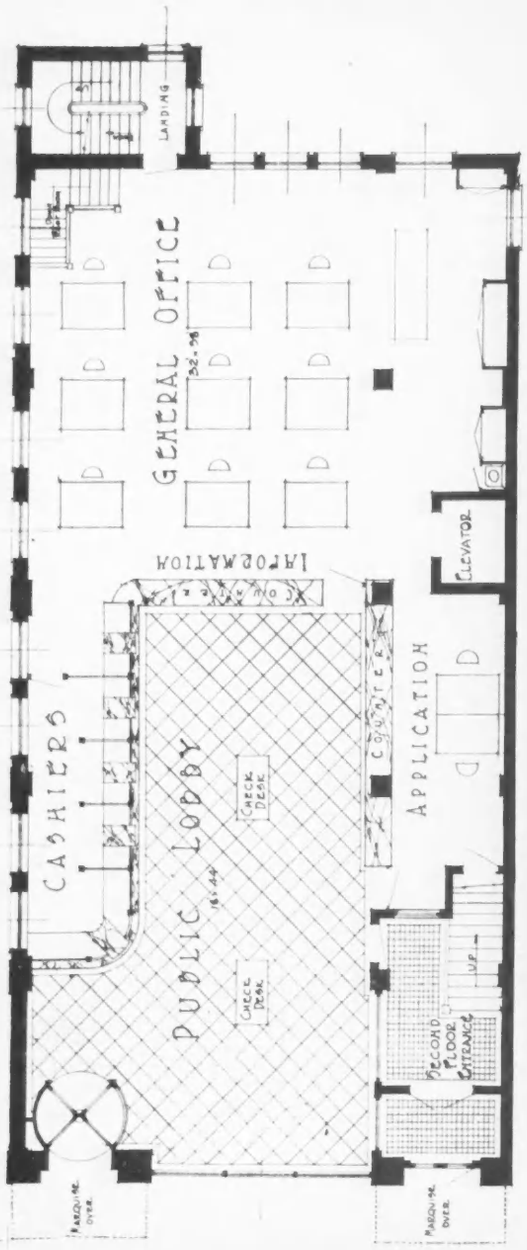
THE building is of stone, concrete, tile and steel construction and has a frontage of 40 feet. Its four stories and basement are used exclusively by the office, operating and engineering forces of the electric service company.

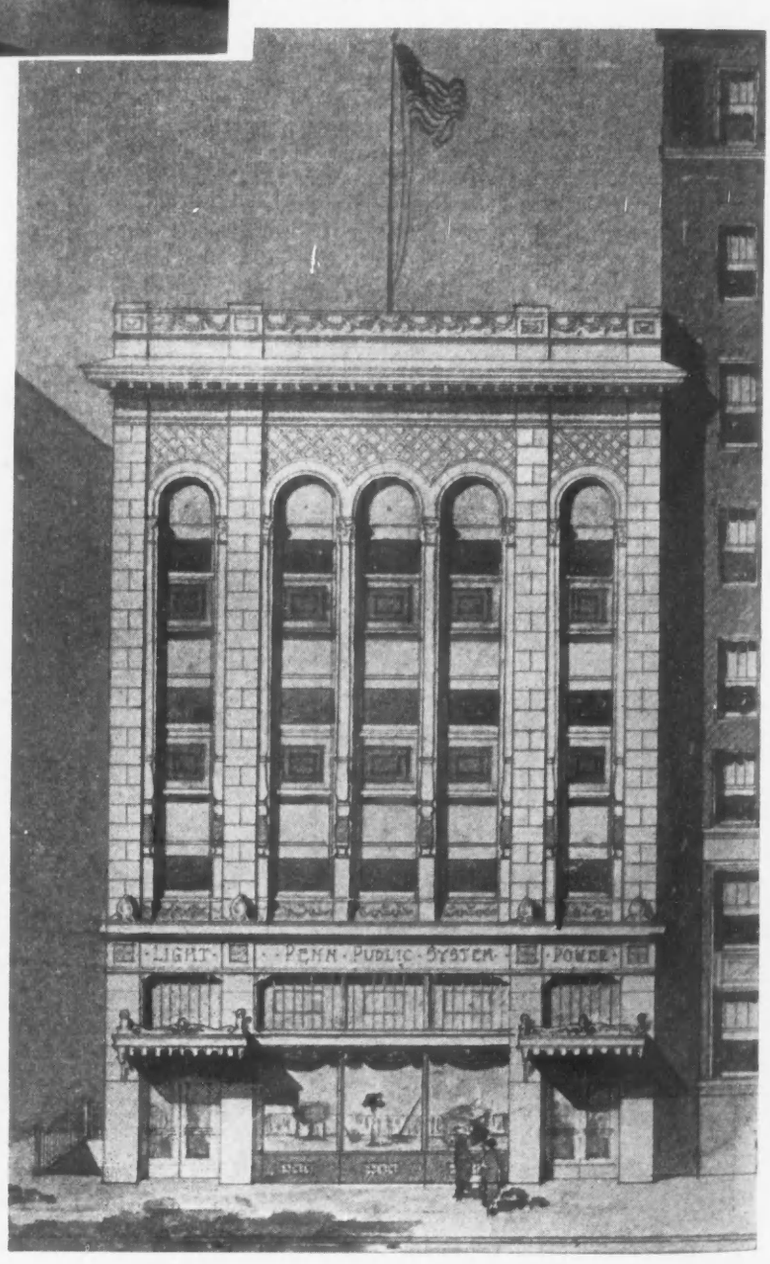
A spacious lobby of marble and tile was designed for the first floor. Here are found cashiers, information and billing clerks and commercial experts. The second floor has been laid out in offices for thee accounting departments and executives of the company. The third floor is taken up by operating and construction engineers.

The fourth floor is a recreation center completely equipped with electric kitchen and fitted out for dancing and supper parties of the employees.

Construction work was handled by the Henry Shenk Company, Erie, Pa.; Shutts & Morrison, Architects, Erie, Pa.







The Ground Floor Arrangement Is Commodious and Convenient, as Shown in the Plan at Left and Photograph Above. Shutts and Morrison, Erie, Pa., architects.

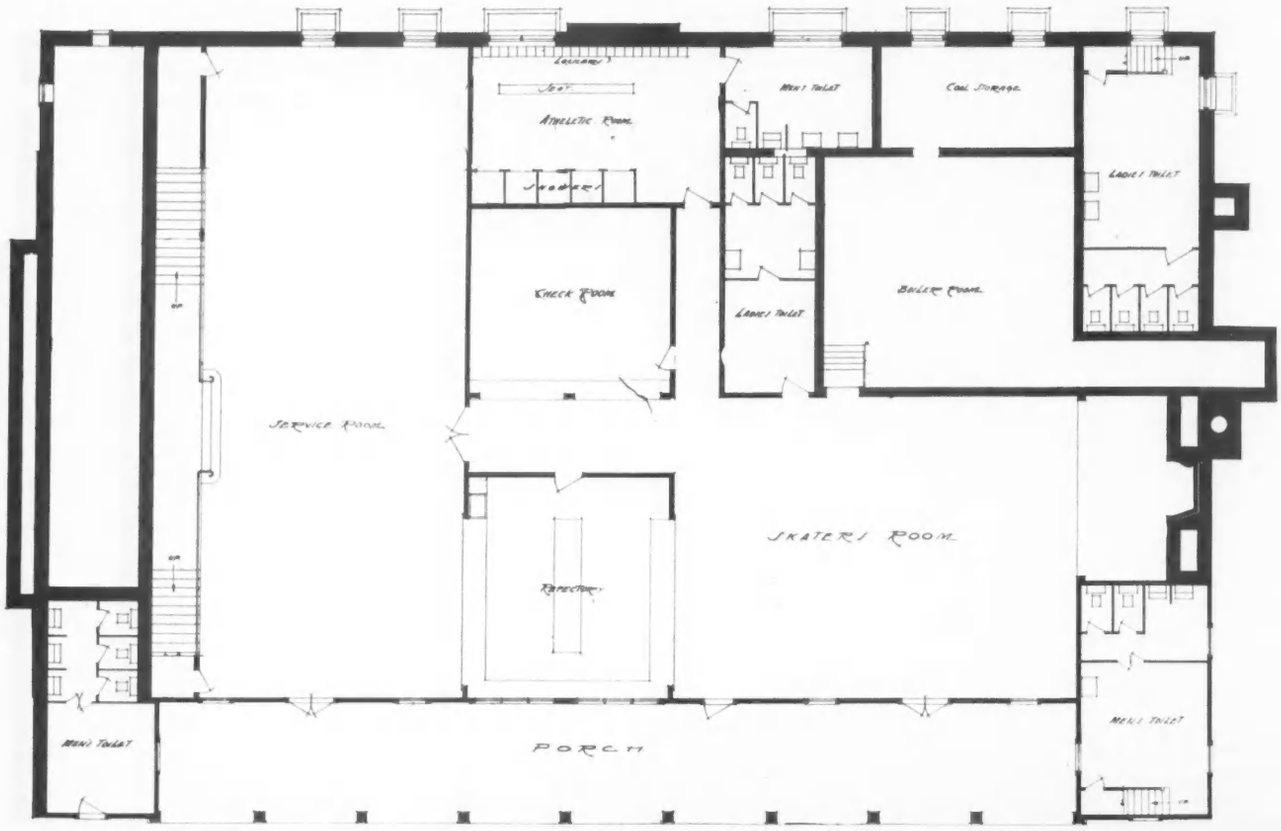
Light and Airy Factory Building





This Shirt Factory at Stamford, Conn., Provides Its Employees with Admirable Working Conditions, as Shown by the Interior Photograph. Note the clear floor space unimpeded by columns, due to the steel roof trusses, and the excellent light and ventilation provided by skylights and ventilating sash.

Well Arranged Park Pavilion of Colonial Architecture

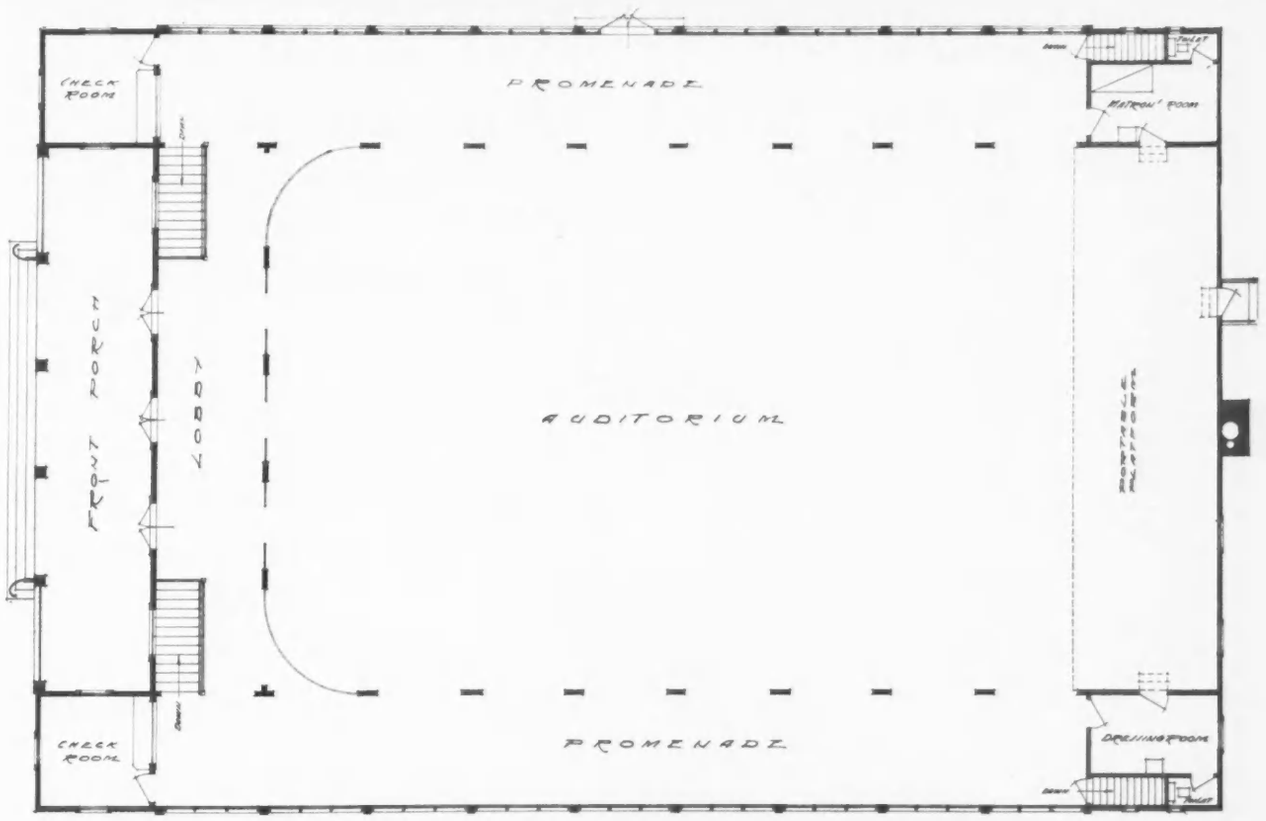


Ground Floor Plan.

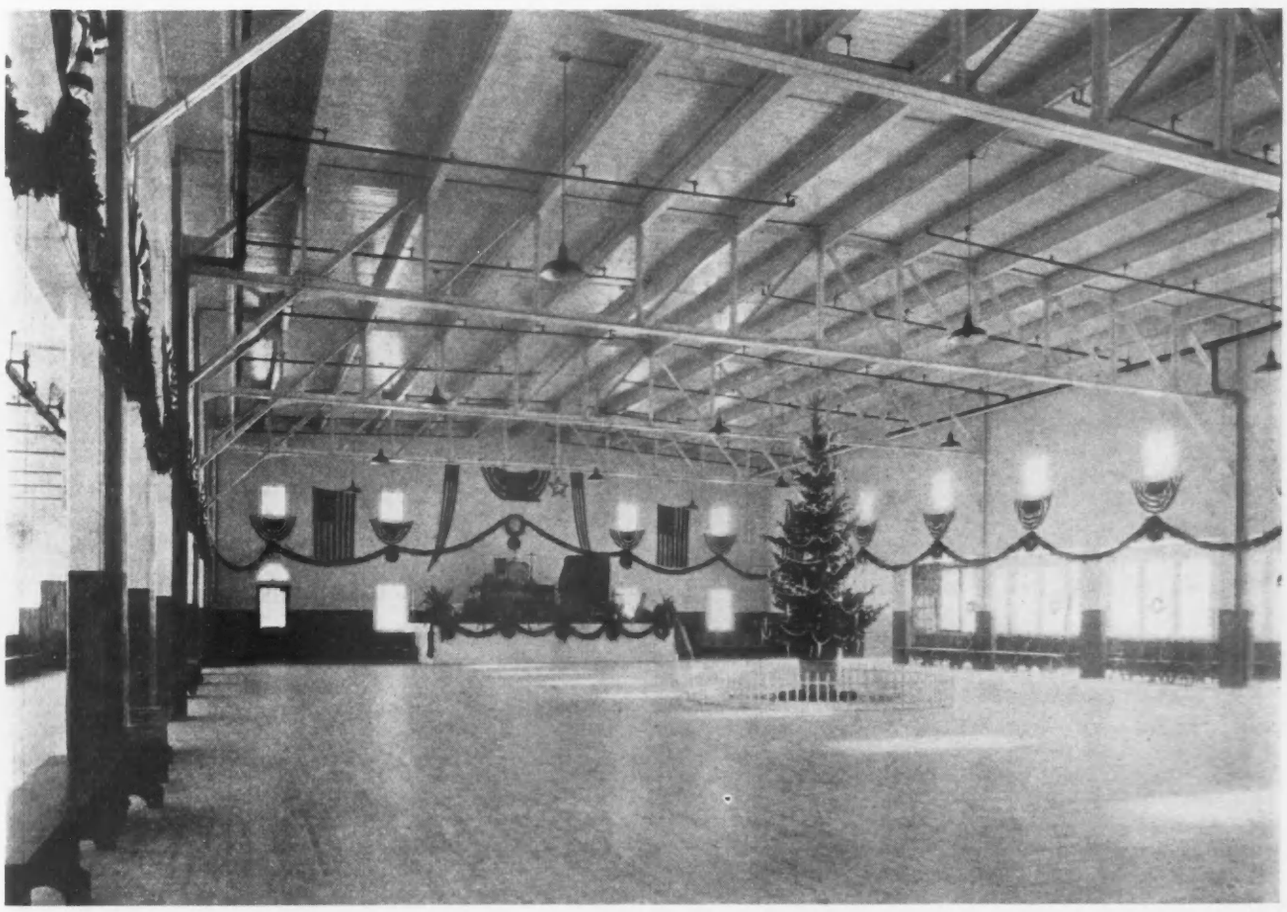


Of Fine Colonial Architecture and Admirably Arranged to Serve the Recreational Needs of Park Visitors, This Beautiful Park Pavilion Stands in One of the City Parks, of Waterbury, Conn. Fred G. Webster, architect; The Tracy Brothers Company, builders.

Design for Community Center



Main Floor Plan.



The Plans Show an Auditorium with Ample Floor Space for Dancing or Community Meetings on the Main Floor, with Promenade on Each Side. The ground floor plan on preceding page shows the well arranged refectory, check room, toilets and other facilities.

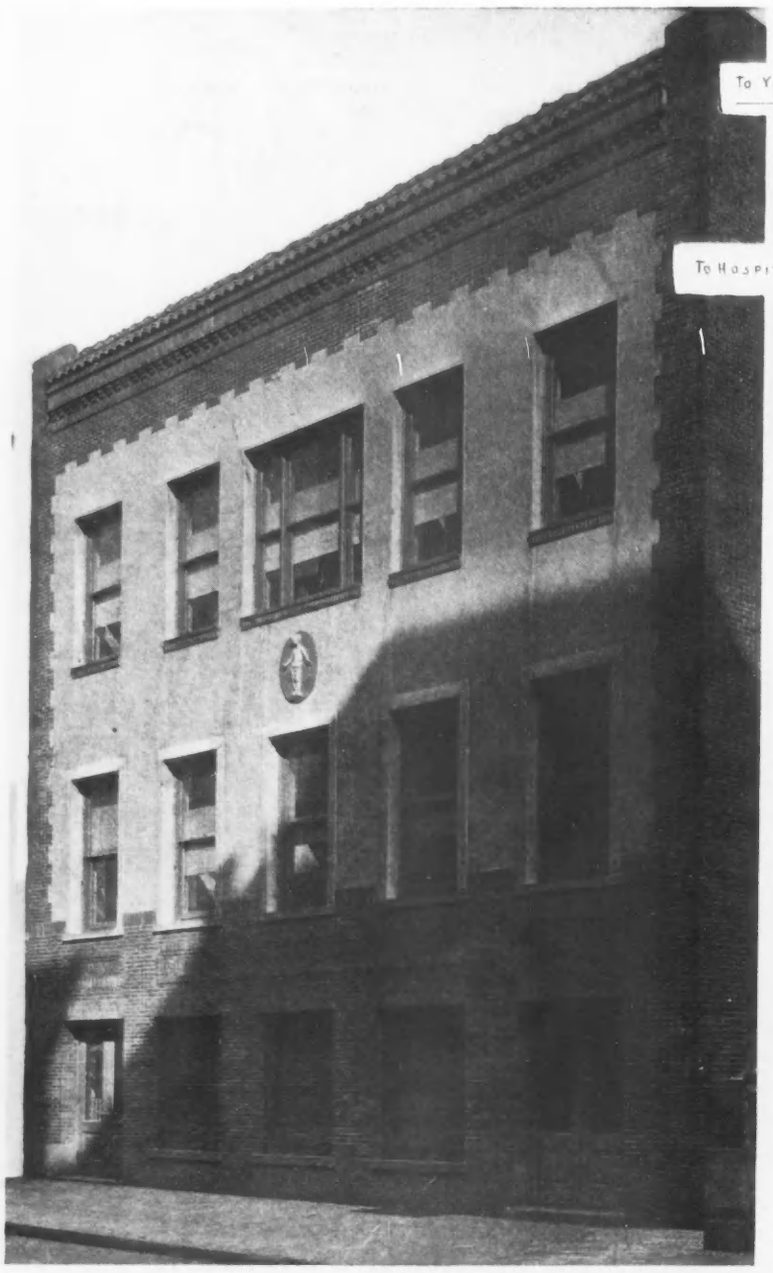
Dispensary Building for the New York Infirmary

A Hospital for the Treatment of Women and Children in New York City

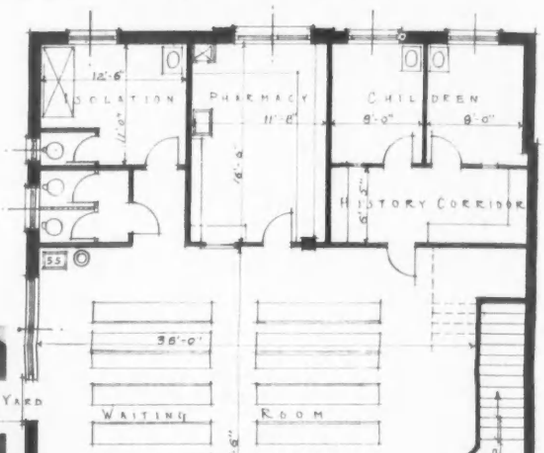
By CHARLES BUTLER, Butler and Rodman, Architects

THE dispensary building is 42 feet in width and 60 feet in depth, with light on front and rear and on a portion of the west side. The typical arrangement, as shown on the plans, consists of five treatment rooms on the front and five on the rear on each floor, with the stairs on the east side against the blank wall, lighted by a skylight and leading directly to the street, while the central waiting room on each floor receives direct light from the west and borrowed light where the partitions for history corridors and treatment rooms do not run to the ceiling.

The entrance door is at the west end of the building, giving access to the main waiting room with office and social service room on the street front, separated from the waiting room by railing and counters; between these rooms is a small room which permits of private conversation with patients or their friends.



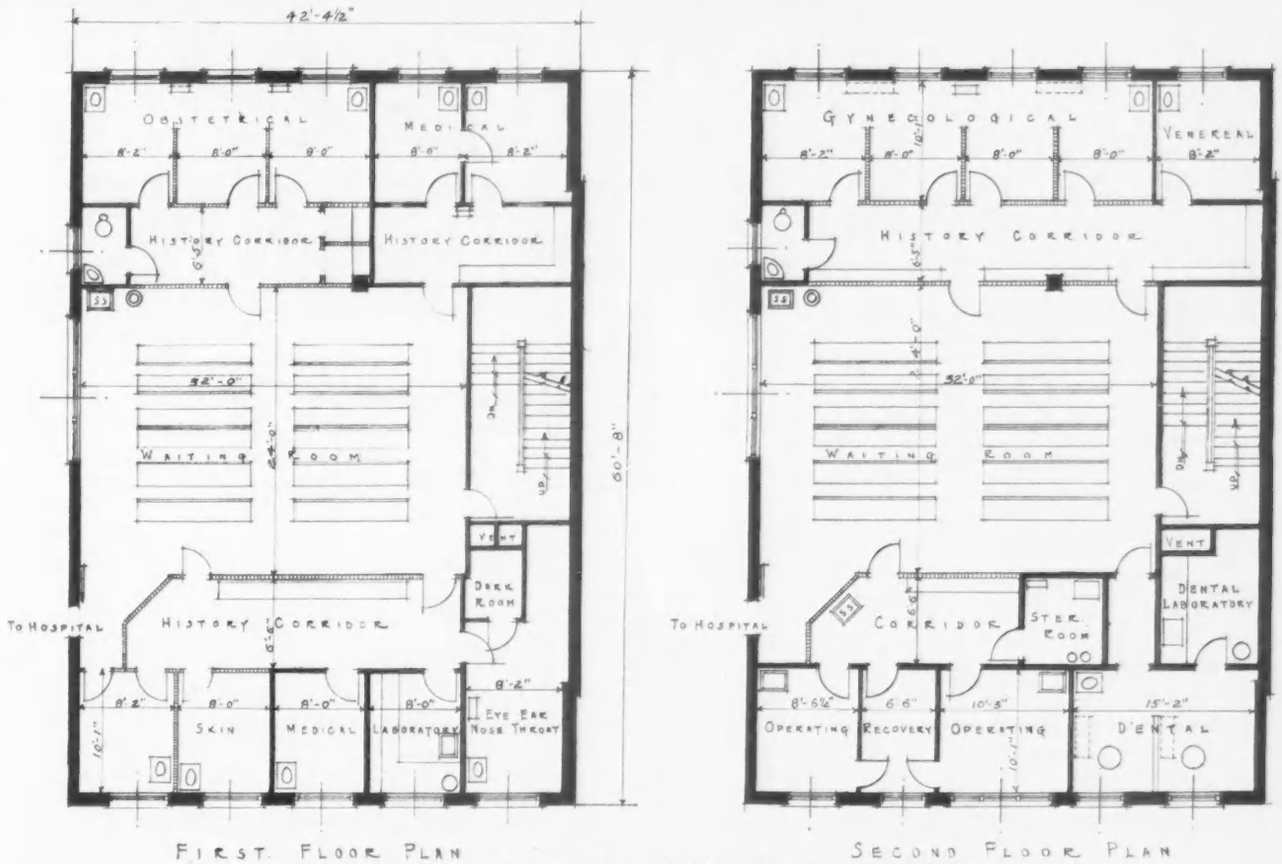
This Small Hospital Building, Designed by Butler and Rodman, Architects, Is Mainly for the Treatment of Out-Patients.



To the north of the waiting room in the corner are the isolation room and toilet for the care of contagious cases until they can be removed to the proper hospital, this being a requirement in all dispensaries in New York. East of this room is the pharmacy with delivery window and with dumb waiter leading to the drug storage room in the cellar. In the northeast corner are two treatment rooms for children's diseases.

The first floor contains, in addition to the central waiting room, on the front, the eye, ear, nose and throat room, a medical treatment room, the laboratory, and the room for the treatment of skin diseases, and in the rear three obstetrical and two medical rooms.

On the second floor are two dental treatment rooms, a small dental laboratory, two small operating rooms with sterilizing room and rest room on the street front, and in the rear the large gynecological service with four treatment rooms and one room for venereal treatment, the waiting room being similar to those on the other floors.



Arrangement of Space in Dispensary Building for New York Infirmary.

Public toilets for women and children are provided on the ground floor in connection with the waiting room and there are on the upper floors toilets in the gynecological and obstetrical departments, while drinking fountains are placed in each waiting room.

The arrangement of partitions around history corridors and treatment rooms is the result of studied planning. A standard height of about eight feet has been adopted except in the operating rooms and where it was necessary to keep out sound, as in the case of the medical treatment rooms, or to keep it in as in the dental rooms, or to provide the means of darkening, as was done in one of the gynecological rooms.

The treatment rooms are small, eight feet on centers of partitions, and ten feet in depth, but this dimension has proved practical. In the gynecological and obstetrical departments the partitions between treatment rooms of the standard eight-foot type are spur partitions and do not extend to the outer wall. The arrangement thus permits the use of one sterilizer for two rooms.



View Showing Spur Partitions in Treatment Rooms Permitting the Use of One Sterilizer for Two Rooms.



View of Baby Bath. Note the stall type of window which allows ventilation without direct draft.



DETAILS OF HOME BUILDING

Elements of Structure

Concrete Masonry and Stucco

By V. L. SHERMAN,
Lewis Institute of Technology

ONE of the blessings to which we, in this country, are heirs is reasonable diversity in building materials. Because of the wide geographical latitudes and the differences in climates we are able to check the best methods and materials over the whole range. None of these methods or elements should escape the architect or builder who has an interest beyond his collections and they should not escape the prospective client. By the signs of the times they do not.

It is not to be supposed that every village in the country is to support a collection of conglomerate types of houses, or that what is good in one locality is necessarily good in another. The gist of it is that we have a much wider range from which to choose, and less tacit objection to the more or less new type of building. To concentrate on one point for decision in choice of building materials take simply freight rates. The question of transportation facilities can bring more saneness onto the job than anything else.

Perhaps that is the reason for the saying that the best of building materials is any one of them. They are all best. Many, of course, will not agree with this and you can put them down as biased, reasonably so, for no contractor or architect worth while but has his favorite methods and materials. If he didn't have them his finances would show it.

One of my friends has the brick veneer habit and what a complete job he can make of it! There is positively nothing finer. Another would not have a veneered wall on a bet but sticks to "concrete masonry." They are both absolutely right and with others of such set purposes are obliging the building industry by helping to refine their own particular branch. Do you get the drift?

So in starting these sketches of the various elements of structure we propose that for every house there are suitable materials which will bring advantages to the building and its appearance. And we also propose that in nearly every locality there are conditions and limits which are well to be observed if the house is to be built with economy. These limits are not always freight rates although freight rates are often the limit.

Years ago we used to speak of "cement block" houses and were told to observe their dampness and ugliness. But times have changed. Only the other day I had to be pardoned for mentioning a cement-block house. The term is not only passé but supposed to be obsolete and justly so, for there is scant resemblance to the ancient type in the new home built of concrete masonry.

But before going any further, the question of dampness ought to be put plainly. Dampness may have ill effects and on the other hand dryness may have as bad. Chronic cases of either lead to fatal results. But a good deal of so-called dampness is from the condensation of normal atmosphere on relatively chilled surfaces. You will find this anywhere. But it is easily and usually prevented.

Take, for instance, a solid wall of any type of masonry. At times that wall will become cold enough to reach the dew point. But suppose the wall has a furred inner surface, providing an air space for heat insulation or is continuously hollow providing its own insulation. How much more slowly will that temperature be reached on the room wall? In a house of the hollow wall type having its lath and plaster on furring you have really more air cell space than in a frame stucco house which, so far as I known, has never been accused of dampness.

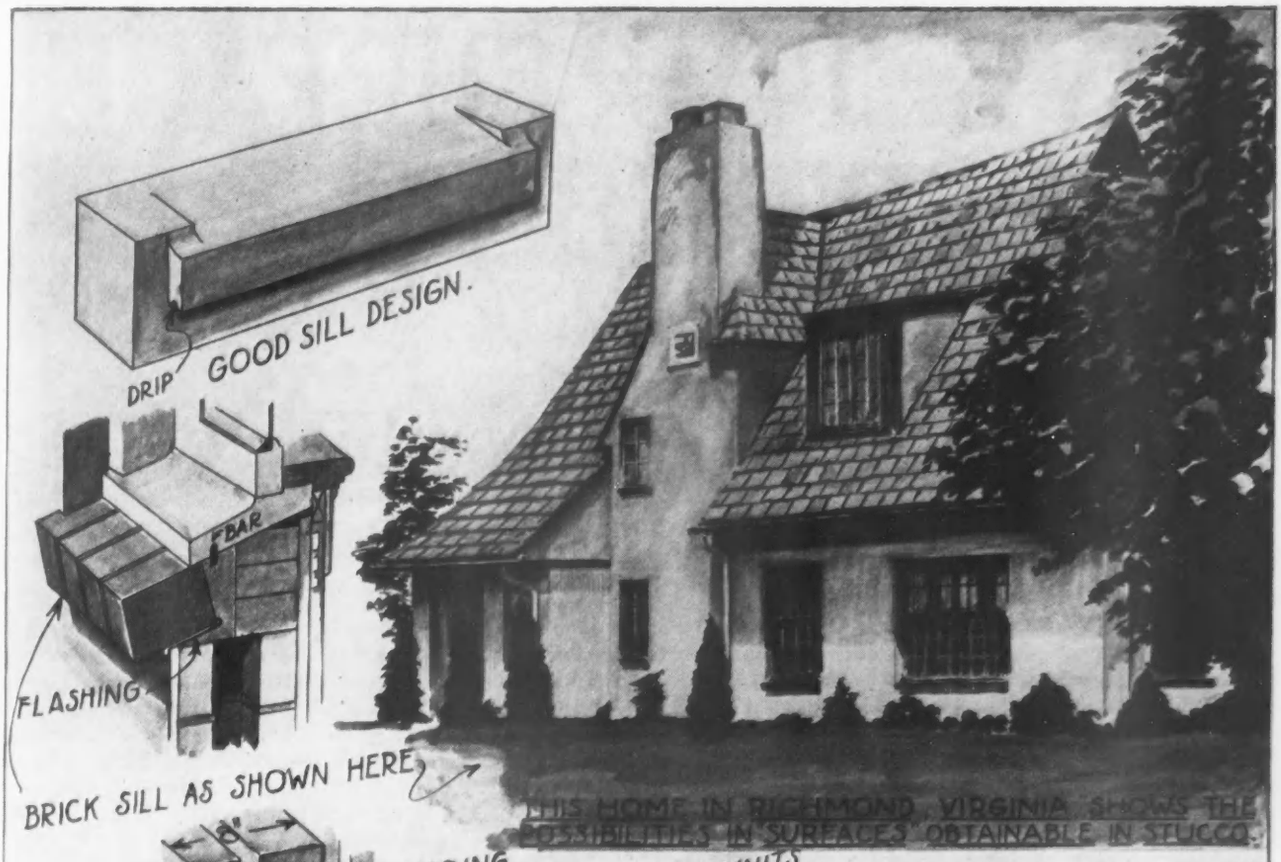
They have taken rock face building blocks away from us because they look like sin and require too much cement stucco to alter their appearance. No matter how they are pointed, they all seem to be going south.

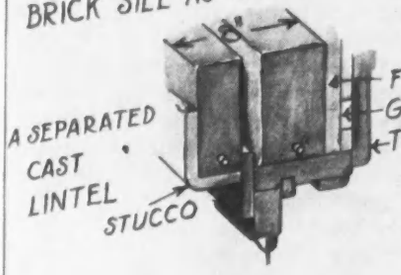
The modern method is scientific, reasonable and really beautiful in results. Starting from the footing, the wall goes in with precision and known strength, receptive at any point of artistic trim and change of line. Dozens of combinations in construction are readily absorbed by this same block wall and when finished the cement stucco will allow as much latitude in type as one could wish. For example, take the two houses shown. Except for desired wood surfaces they might both be built of concrete masonry from bottom to top.

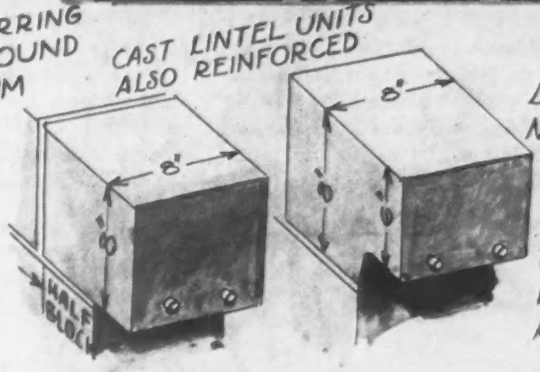
Most builders know that there are blocks sufficient in form to provide for every emergency and to these the sketches to the left of the page are familiar. But the art of concrete is stepping along. All of the effort of the industry goes for improvement and past effort now enables the building of the soundest of houses with a wide choice of architecture.

Not all walls are furred on the inside. If proper air cell space is embodied in the wall and the outer surface is waterproofed there is no great reason for it. Then it becomes a question of grounds and this may be taken care of in a number of ways.

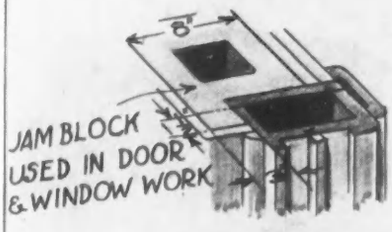
The outer surface is what seems to be most intriguing at the present. Texture and color seem to run riot. There seems to be a texture for every race and a race for every texture. I have seen so many different textures so well adapted that it is impossible to specify. So we can say withal that concrete masonry is of the best.

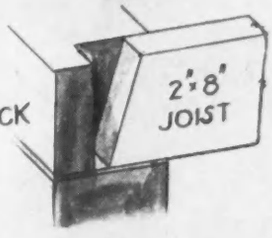


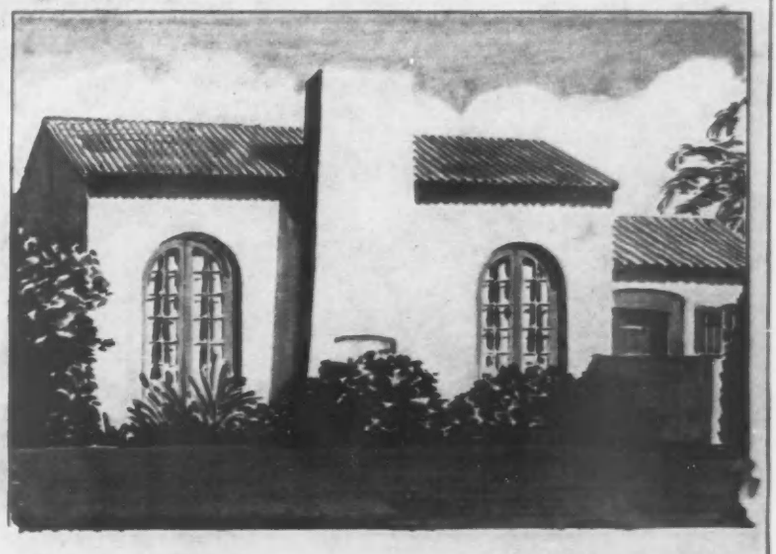


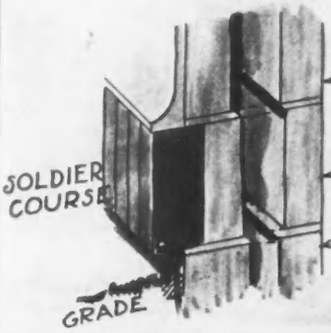


LINTELS ARE NOT NECESSARILY OF CAST CONCRETE, BUT THIS TYPE OF BEAM PRODUCES CONSISTENT AND VERY SATISFACTORY RESULTS.









NO FINER REFLECTION OF BRIGHT WEATHER CAN BE FOUND, AND NO BRIGHTER CONSTRAST FOR THE SETTING.

O. L. Sherman - 2-9-26.

SAVE THE SURFACE DEPARTMENT



The Decorative Possibilities of the Small House

THE small house, while attractive to the majority of home seekers, is apt to minimize its charm and desirability by its poorly conceived decoration. Why the small house should be slighted in this regard is hard to understand. Much time and effort are given to the decoration of large and imposing houses, whose market is, in a sense, waiting for them, but the little house must limp along with indifferent decoration.

As a matter of fact, the little house offers far more opportunity for original and attractive decoration than the big house, and at smaller cost. Whatever one saves in skimping on exterior and interior decoration is lost in the decrease in desirability and attractiveness of the house. After all, if a house is not quickly sold, if it does not intrigue and delight its buyers, and if it does not add to the reputation of the builder, whatever money is saved in perfunctory decoration does not meet the ultimate loss.

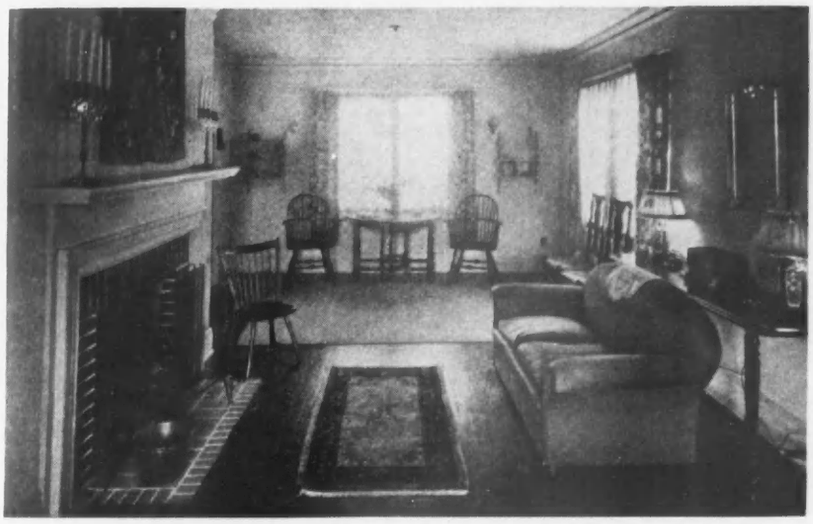
The little house shown here is small but very attractive in line and floor plan. It has a large living room with fireplace, an unusually well-placed dining nook, kitchen, well proportioned, airy bedroom and an attractive sun porch. This is just the type house that young couples, and small families, tired of apartment dwelling, are seeking. The sun porch may be used as an extra bedroom or guest room and there is a drop stairway to the attic which is an excellent space for storage.

There is much in the quaint design to appeal; but, if carelessly decorated, it is apt to become just another small house. While none of the rooms are cramped, still there is ample reason for giving the little house all the illusion of space that is possible. This can be done only by means of interior and exterior decoration.

Since it is small and low to the ground, white or cream color is best for the siding. Either of these will make the



An Attractive Small House Whose Desirability May Be Enhanced by Distinctive Decorative Treatment. Suggestions for both interior and exterior decorations are given in this article.



A Living Room Treatment that Lends Vivacity to the Walls. This is called the Tiffany finish, a blend of three or more colors. It combines well with ivory or cream woodwork.

house look larger than a dark or neutral color would. The roof, which is shingled, may be stained to produce a variegated effect. Several shades of green, beginning with bright apple green and shading to a rich moss green, might be used here. The quaint paneled shutters, in that case, might be apple green—a color that imparts much charm and freshness. Paint the large chimney the color of the siding, while the little terraced entrance of brick, should be painted, too, to bring out the warm rich tones of the brick. In this connection, the chimney pots should be painted to match the brick terrace.

Another, and more colorful scheme would be to paint the siding a light lemon yellow. The roof, then, should be shaded from Venetian red to buff and the shutters painted dull blue.

Still another suggestion is to paint the siding ivory, the roof blue green—a mixture of Chinese blue with medium chrome green—and the trim light green—a shade of the roof color.

The decoration of the interior is even more important and interesting. The principal room is fairly large and opens into the sun room. A large open fireplace at one end of the room and casement windows at the other emphasize the spaciousness. Even though this is a large room, however, it must be remembered that the house is a cottage and unsuited to heavy or palatial treatment. Bright colors, simple treatment and every illusion of space should be employed.

A warm gray color might be used for the walls in order to make the room appear as large as possible. This gray, made from Chinese blue and Venetian red, combines a warm overtone with the peaceful character of gray. If that is used the woodwork should be dark cream and the ceiling light gray. Paneling is very good in a room of this sort.

Even better would be a Tiffany finish in tones of greens, blues and yellows for the walls. This finish is a blend of a number of colors and gives a vivacity to the wall that is totally lacking in a flat finish. The woodwork would be excellent in light yellow and the ceiling pale yellow, too.

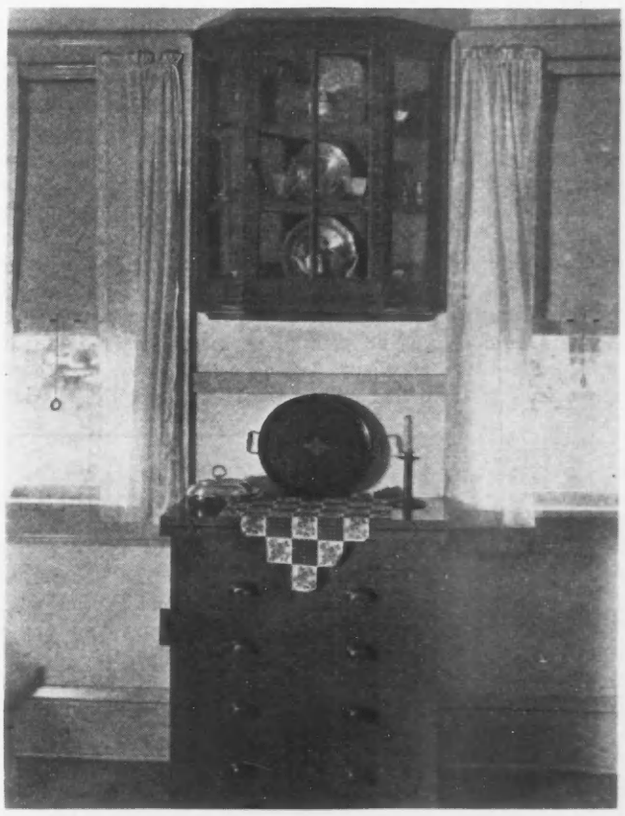
Another type of finish that would be suitable for this room is the sponge finish. A ground coat of lemon yellow is tamped with a sponge loaded with dull blue. The result is a two-color effect that is bright and cheerful. The woodwork should be painted a blue gray, and an effective treatment would be to run a narrow band of black around the baseboards and around the window and door moulding. If the floor is not of hardwood, it might be painted Tuscan red. The ceiling should be very pale yellow.

The sun parlor, which opens off the living room, may boast brighter colors, but they should be in harmony with the living room. It is suggested that the walls be painted to match the living room. The woodwork, too, might match the living room, but it may be decorated with a band of Chinese red, or peacock blue, or the mouldings picked out in a number of colors. The floor of a sunparlor is best painted a clear, solid color—terra cotta, dark blue, black or green. Squaring with black lines is effective here and gives the impression of a tiled floor.

Decorating a breakfast or dining nook is a real joy. The more violent and unusual the colors used here, the better. One of the most cheerful combinations imaginable is coral and bright yellow, with a touch of black. This treatment would be appropriate should the house be placed so that the dining nook window faces north. The walls should be yellow and the woodwork coral, striped along the turnings and grooves in black. If built-in tables and chairs are used, they, too, should be coral with black striping and stencilled flower designs in blue, green, violet and red.

If the room has plenty of sunlight, however, another treatment would be more desirable. The walls might be soft blue and the woodwork apricot color, a sort of pinkish yellow, slightly grayed. With this light green combines beautifully, and may be used for striping, floor color or stencilled border.

The kitchen should undoubtedly be the most attractive room in the house. This is the room on which, it is safe to say, the sale of the house hinges. If the kitchen pleases milady, the house is sold. If all the rooms but the kitchen

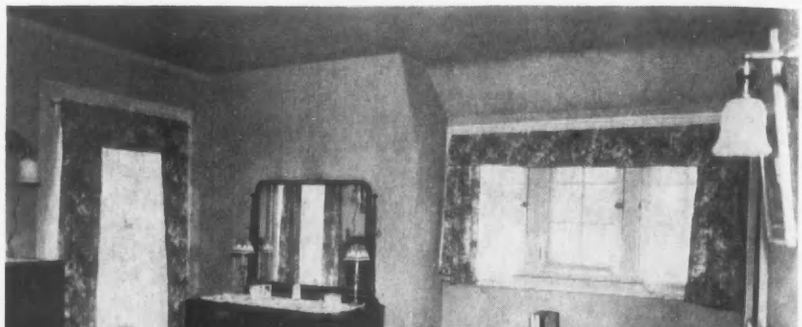


The Colorful Kitchen Walls, Woodwork and Built-In Fixtures, All Painted a Different Color, Lend Charm to the "Engine Room" Which Is So Often Neglected.

please her she is apt to go elsewhere in her search for a home.

Should the kitchen be on the north side of the house, bright, cheerful colors had best be used. Paint the walls a cheery canary yellow and the woodwork dull blue. Then, for contrast, paint the insides of cabinets, closets, and outline the moulding of the woodwork with vermillion or scarlet. The floor, too, should be painted, a darker shade of red—Venetian red combined with chrome yellow and lamp black.

If the kitchen has plenty of sunlight, as all good kitchens should, its decoration should suggest cool breezes and fresh air. There is a shade of blue-green, made of Chinese blue and chrome green and lightened to a tint, that is excellent for a sunny room. If a pale green is used on the walls, this blue green for woodwork and floor, the effect would be very cool and cheerful. Wherever possible paint the interiors of closets and cabinets a bright lemon yellow and the ceiling of the kitchen, too, should repeat this yellow in a pale tint.



A Bedroom Finished with Light Gray Woodwork and Apricot Colored Walls Lends Itself to Pretty Chintz Curtains and Handsome Furniture.

The bedroom, a large, square room, should suggest rest and comfort. Since the house is cottage style no doubt it will be simply furnished and hung with crisp ruffled curtains and bright chintz. Cream or ivory woodwork is usually attractive in a bedroom. One treatment that gives a dainty effect is a three-color sponge finish using pastel shades. On an ivory or cream ground color, light blue, coral and lettuce green is tamped on with a sponge. The coral or the blue may be emphasized. In either case, the green should be subordinated.

If this finish is used the ceiling might be either pale rose or light blue. The floor, if not of hardwood, in which case it should be highly varnished, might be deep blue or old rose. If desired, a stencilled border of conventionalized flowers might be added to the wall finish about two feet below the ceiling line. Green, yellow, lavendar, rose and blue might be used in this border.

Another treatment is based upon soft French gray woodwork. The walls are painted a flat color, apricot, and the floor dark gray with a stencilled border; near the baseboards, of light green, yellow and blue. The ceiling should be apricot color.

But the decoration is not complete until the bathroom has been considered. The tendency is to paint that room white with no color relief whatsoever. This is unfortunate, since the bathroom deserves the boon of color as much as any other room in the house. One decorator recommends that the bathroom always be painted to match the main bedroom. This is an excellent idea, especially if the bathroom opens directly from the bedroom. This is not the case in the little house in question, so that the decorator has a comparatively free hand.

A bathroom decorated in shades of green is always successful. Light green for the walls, blue-green for the woodwork and floor (if it is not tiled), with orange, vermilion, or Chinese red for closet interiors combine pleasantly. Painting the interior of closets is a brilliant stroke, since it makes them light and sanitary as well as attractive. The woman buyer immediately looks at closets. Make them as persuasive as possible.

The blue and white bathroom is always good, even though it is stereotyped. If you should decide upon a blue and white bathroom in this little house, why not add a note of vermillion to the woodwork or closet interiors? This would take it out of the commonplace and add warmth as well.

Another successful color scheme for the bathroom consists of two wall colors with a stencilled border about half way up the wall, forming a dividing line. The lower half might be blue, the upper half light yellow and the stencilled border of water lilies in which creamy white, green and yellow predominate.

One of the advantages of an attractively decorated house is that it immediately suggest furniture, curtains and rugs to the buyer.

A lifeless, undistinguished room may be accepted, but never with enthusiasm. A glimpse of a pretty, daintily decorated room immediately gives rise to mental pictures of certain curtains, chairs and other "fixings" that are so dear to the woman's heart. The desire to take advantage of an attractive background is a decided factor in persuading a sale.

Modern Decoration in the Home

THE influence of modern taste upon the decorative and industrial arts cannot have escaped anyone who deals in the important matter of homes and home building. It remained, however, for the French Government to crystalize this influence by means of the exhibits at a large exposition held in Paris. This was the International Exposition of Modern Decorative and Industrial Arts at which were shown the products of craftsmen and manufacturers from all parts of the world. Architectural styles, textiles, furniture, jewelry, glassware, and tapestries were but a few of the products exhibited.

Probably the most important contribution of the exposition was its hints—hints of future modes of decoration, architecture and even home life. Brilliant colors were used in every conceivable place, thus sounding the death knell to the dictum that bright pigments are not in good taste and that the properly decorated room should be neutral in tone. This is almost exactly a reproduction of the revolt of the younger artists some years ago, and the new movement in art that followed has naturally given impetus to a freer development of the crafts.

The exposition was not a "freak show," although it may have had some of that element. Perhaps its contribution to decoration can best be likened to the contribution to the

season's fashions made by promenading mannequins of famous Parisian modistes, who, garbed in costumes that defy one's wildest dreams, are now setting the style for the coming season. The gown worn by a mannequin incorporates all of the fashionable points of dressmaking and designing that will be used during the season. Women of taste and discrimination adopt certain features of that style, but not all.

Those of us who are dealing chiefly with some phase of the construction or decoration of the average home must select from the treatments suggested whatever features appeal to us. Despite the radicalism and freakishness that did evidence itself at the exposition it is safe to say that the small home will be affected by the ideas demonstrated.

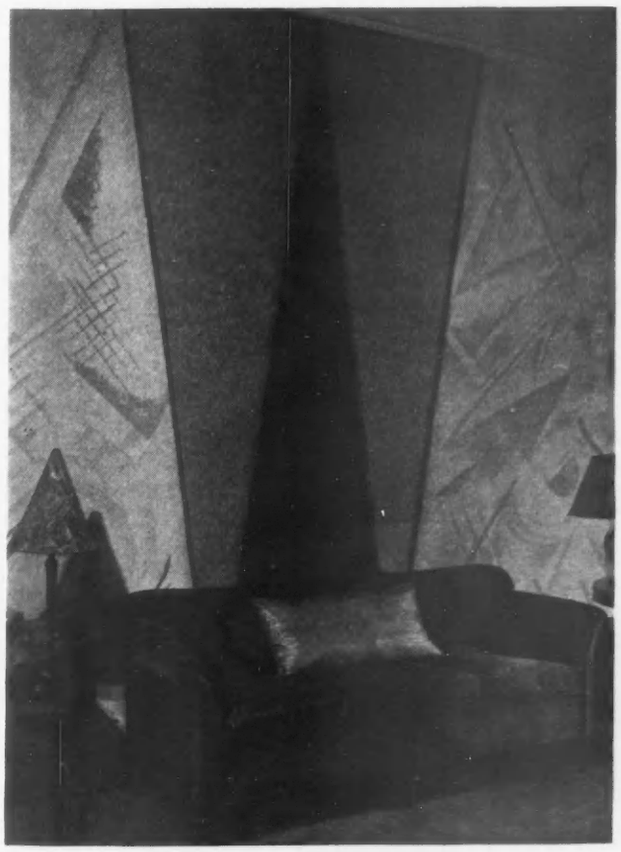
The drab wall, the uninteresting decorative scheme and all the ear marks of the "age of gloom" are doomed. Purer color and more individuality in decoration will naturally follow. Already this has been indicated in the increased and increasing number of homes decorated with paint. The flexibility of this medium adapts it peculiarly both to color effects and individuality in technique. Much has been said about the practical aspects of paint and too little about its aesthetic qualities. The fact that paint is sanitary, that is easily cleaned, and that it protects is very important and absolutely true—but after all it is a beautifier.

Pure brilliant color, shaded, tinted, mottled, spattered, effects in as many different tones as one wishes—this is the contribution of paint to the home. Prominent decorators have long made use of the variety and flexibility of the medium. The decorator uses paint as the artist uses it. Instead of a palette, of course, he has a pot and the walls are his canvasses, but aside from a few superficial differences, it is fundamentally part of the same scheme of things.

One of the points most emphatically displayed at the exposition was the necessity for individuality. Unless the mediums themselves are flexible—unless they lend themselves to individual handling—the breathtaking decorative innovations of today will be bromides tomorrow—as uninteresting then as the chromos and whatnots of the last generation are now.



The Studio of Mrs. Nina Broderick Price, in New York, Abounds in Modernistic Flourishes and Futuristic Touches. The wide awake decorator, however, can take many valuable hints from this interior treatment.



This Is the Way the Interior Decoration Wind Is Blowing. After the first shock, however, it dawns on one that this wall treatment is very refreshing and restful.

Architecture, fortunately, is flexible, as are design and patterns, when those in charge get rid of the authority of the dogmatic rulings of custom. The exposition proved beyond any doubt that design and decoration are beginning to throw off their shackles. Color, as important in decoration as design, must not be stereotyped.

In using paint for any of the multi-color wall finishes, or for any other decorative purpose, no two "jobs" are identical. Each has its personality. This is because paint is a flexible, not a staid medium. Its possibilities in decoration have scarcely been touched. They are fathoms deep, waiting to be "discovered" by those whose ingenuity and skill are making every day for better and more beautiful homes.

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Register "Save the Surface" Slogan

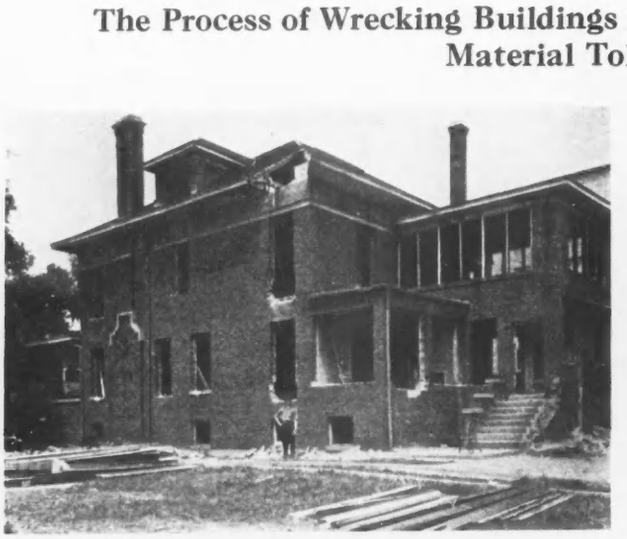
THE Save the Surface slogan is now registered in forty-three countries, and application has also been made for registration in eight others.

The Save the Surface slogan had become so valuable and so well known the world over that in order to prevent its registration by individual concerns, it was found that it would be more economical to secure registration in these countries than to continue year after year to oppose the application of individual firms who were applying for registration in their own company name.

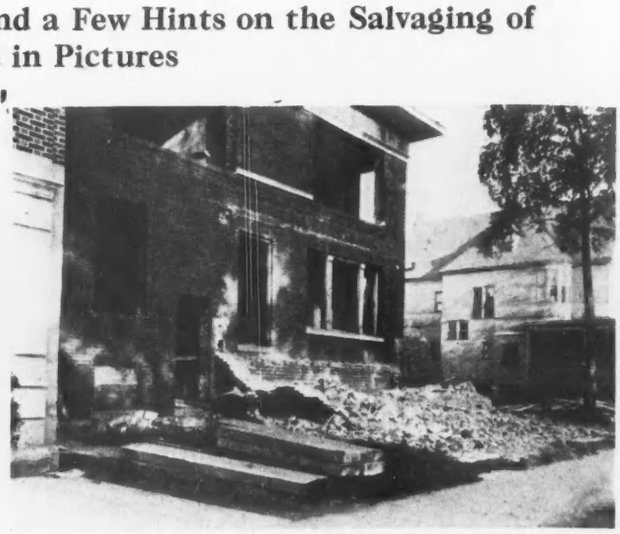
Registration in these foreign countries prevents its exclusive use by any individual manufacturer or company, and makes it available for use of all manufacturers in these countries as well as those in the United States.

Demolition of Old Buildings

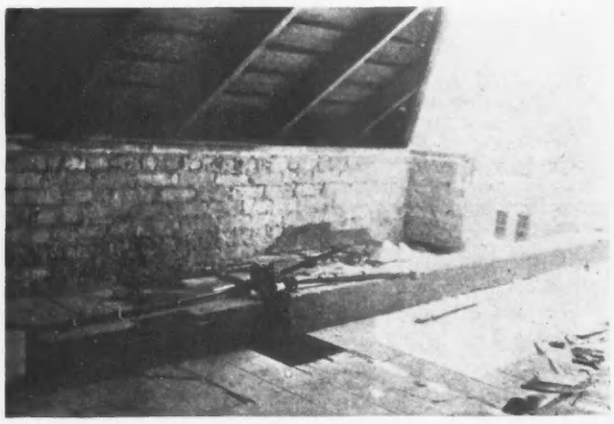
The Process of Wrecking Buildings and a Few Hints on the Salvaging of Material Told in Pictures



The Start of the Job, Showing the Building "Gutted Out," All Sash Frames and Interior Finish Removed and the Roof Ready to Be Taken Off.



The Second Step Is to Remove All Projections. Here the front porch is being taken down and the cut stone copings carefully laid aside.



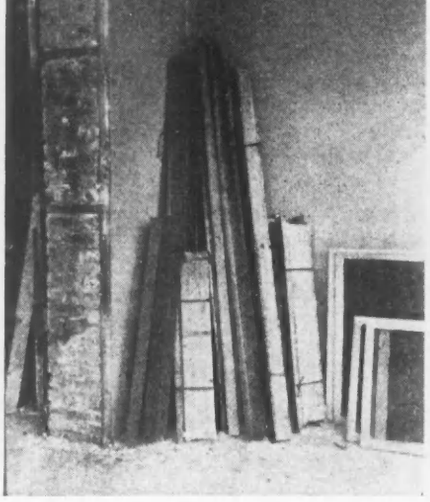
This Is Probably the Most Satisfactory Method of Holding the Timber for Supporting the Hoisting Pulley.



A Runway from the Second Floor Is Provided for Depositing the Bricks, Which Have Been Cleaned, in Piles.



Window Sash Have a Greater Second-Hand Value if They Are Accompanied by the Frames to Which They Are Already Fitted.



The Casing, Jamb and Head Moulding for Each Door Should Be Carefully Removed and Tied in One Bundle.



A Small Double Bladed Ax Is Used to Clean Bricks and the Rubbish Drops to the Floor Below Through the Hole in Front of the Men.

Wrecking Old Buildings

THERE is an old saying that nearly all of us have heard, "What goes up must come down." This is true of buildings as well as other things. No building can be made to last forever—sooner or later it must return to the dust whence it came. Either it falls to ruin as is the case with the old Roman temples, or it must be torn down to make way for a new building.

The recent building boom which has been in progress in all sections of the country has been the cause of razing many an old building to make way for a newer, larger and more beautiful one. Increases in the value of real estate have made it profitable to remove old buildings so that new ones, planned for increased revenue might be erected.

Not all of a building need be considered a loss if the wrecking contractor is awake to the opportunities for profits in the salvage. With the present high prices of building materials in mind, many a contractor is glad to use second-hand material for jobs where particularly fine work is not required. With the exercise of a little care in removing them considerable profit may be made from materials removed from old buildings.



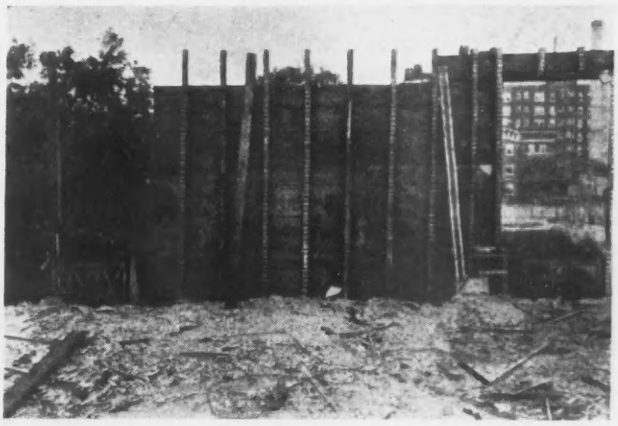
When Everything of Value in the Old Building Is Carefully Salvaged, the Rubbish Pile Will Be Small.



From the Runway, Shown on the Opposite Page, Cleaned Bricks Are Piled to Be Picked up by the Salvage Trucks.



Second-Hand Lath Is an Item of Salvage Which Is Often Overlooked But Is Well Worth Consideration



Sheathing Can Be Stripped from the Studs Without Damage by Knocking It Off with the Front of a Pick.



Salvaged Lath Should Be Tied in Bundles, They Are a Readily Used Type of Second-Hand Material.



Here Is the Method of Taking Up Floors so as to Save the Material for Further Use.



Pulleys Suspended from a Beam to Lower Steam Radiators, and Plumbing Fixtures to the Salvage Truck.

Transforming an Old Mansion

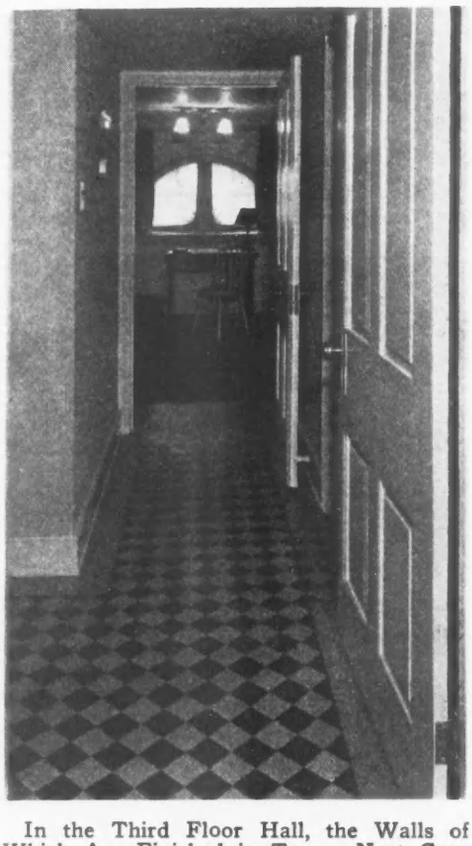


A Typical Mansion of the Civil War Period Which Was Transformed Into a Modern Country Residence by the Installation of Modern Heating and Lighting and Complete Interior Refurnishing Which Included the Laying of Linoleum Floors Throughout.

BACK in the days before the Civil War, this old house was built by a Lancaster, Pa., business man for a summer home. In it bearded men in frock coats and ladies in swaying hoop skirts danced the polka and the quadrille. Its stable sheltered a fine coach and span of glossy coated horses, cared for by a dignified, white-haired darkey. Down the Lititz Pike that passes its front door marched the Pennsylvania boys who answered Lincoln's call to defend the Union.

More than once in its history this old house has changed hands. The names of the original owners have become memories. From the typical brick farmhouse of the Civil War period it has been transformed into the fine country home of today.

Five years ago its present owners undertook a thorough restoration of its interior. New paper and paint, and the installing of a modern heating plant and lighting, preceded refurnishing throughout. New floors were needed. Instead of relaying with hardwood, it was decided to install linoleum throughout, putting it in as a structural floor. It was laid right over the old boards. Instead of being tacked down it was cemented over builders' heavy deadening felt which took up any unevenness of the boards and made a quiet, draft-proof, practically one-piece floor. In addition, there were the advantages of easy cleaning and color harmony with walls and draperies.



In the Third Floor Hall, the Walls of Which Are Finished in Tan, a Neat Gray Block Pattern Linoleum Covers the Floor.

As one steps inside the front door his eye rests on a hall floor of inlaid linoleum in black and cream blocks bordered with black. To the left is the dining room, furnished in walnut. The linoleum floor is of natural marble effect, with brown blocks nine inches square. The border of brown Jaspe blends with the marble on one side and the cream baseboard on the other.

The living room at the left of the wall has a floor of rippled brown Jaspe, a perfect background for the fine fabric rug in plain taupe. The kitchen and pantry have floors of blue, gray and cream cork tile.

The hall of the second floor is floored with gray Jaspe, as are also two of the bedrooms. A third bedroom has a floor of gray Jaspe with a blue border, while a fourth uses green Jaspe. Jaspe, by the way, is a two-tone rippled effect in gray, green, blue or brown. From these colors it is easy to select a floor to harmonize with practically any color scheme in furniture and draperies. It makes, too, an ideal ground for fabric rugs of any pattern. This accounts for its increasing use for bedrooms and living rooms.

On the third floor the hall and bath have linoleum floors of black and gray blocked pattern. One bedroom, into which the morning sun streams warmly, has a floor of

moulded floral pattern in light blue and gray, while the second bedroom on the top floor has a floor of printed linoleum simulating matting, in tan, with a small, widely spaced floral motif.

In making this old house "homey" the part played by linoleum floors can hardly be overestimated. They add color, dignity and charm to every room in the house.

As soon as they were laid these floors were washed with a good, sudsey soap, then thoroughly waxed. All they now receive is a light daily treatment with a mop. The waxing is renewed about every six months. The surface is so protected by the wax that there is practically no wear at all on the linoleum for people walk on the wax coating and not on the linoleum. It is interesting to note that these floors are not slippery and that rugs don't slide about.

The wearing qualities of these linoleum floors can only be estimated but, based upon experience elsewhere, an expectation of 30 to 40 years is conservative.



This Second Floor Bedroom Has Cream Woodwork, Gray Wallpaper and Fabric Rugs Scattered on a Floor of Two-Tone Gray Linoleum With a Light Red Motif.



Tan Walls, White Woodwork, Cretonne Hangings and Linoleum Floor of Natural Marble, Inset with Dark Blocks, Make a Perfect Setting for the Massive Walnut Dining Room Furniture.

In the bedroom and living room, fabric rugs are used just as they would be on hardwood. The cost of these floors laid down was about the same as that of good hardwood. However, they will require no refinishing as the years go by.

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Design of a Modern Bakery

THE building illustrated on page 354 occupies a space of 150 feet and extends back to the alley 120 feet and is one and two stories high with a basement under the main part. In the rear is located a railroad track at such a height that the flour can be unloaded from the cars directly into the flour storage room on the second floor by means of a conveyor. On this floor about eight carloads of flour can be stored at one time. The flour is then blended and sifted into a large storage bin of 50 barrels capacity from where it is elevated into the high speed mixers where other ingredients are added. After the dough is properly mixed, it is stored in troughs in the dough room to proof, which room is kept at a constant temperature of 80 degrees Fahrenheit.

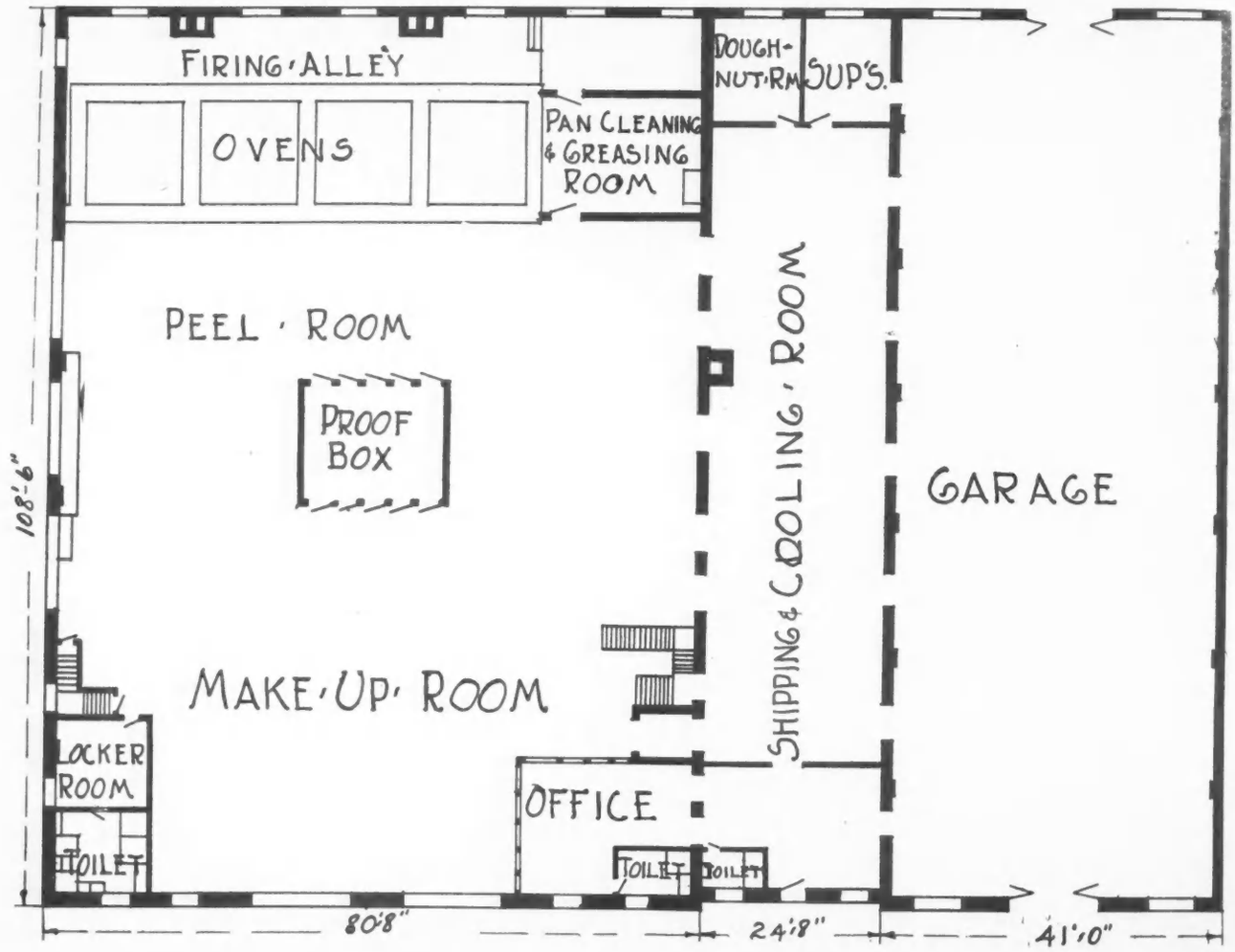
The mixing and dough room is located on the second floor and after the dough is properly proofed it is delivered by means of a chute down to the first floor in the make-up room, shown on the floor plan.

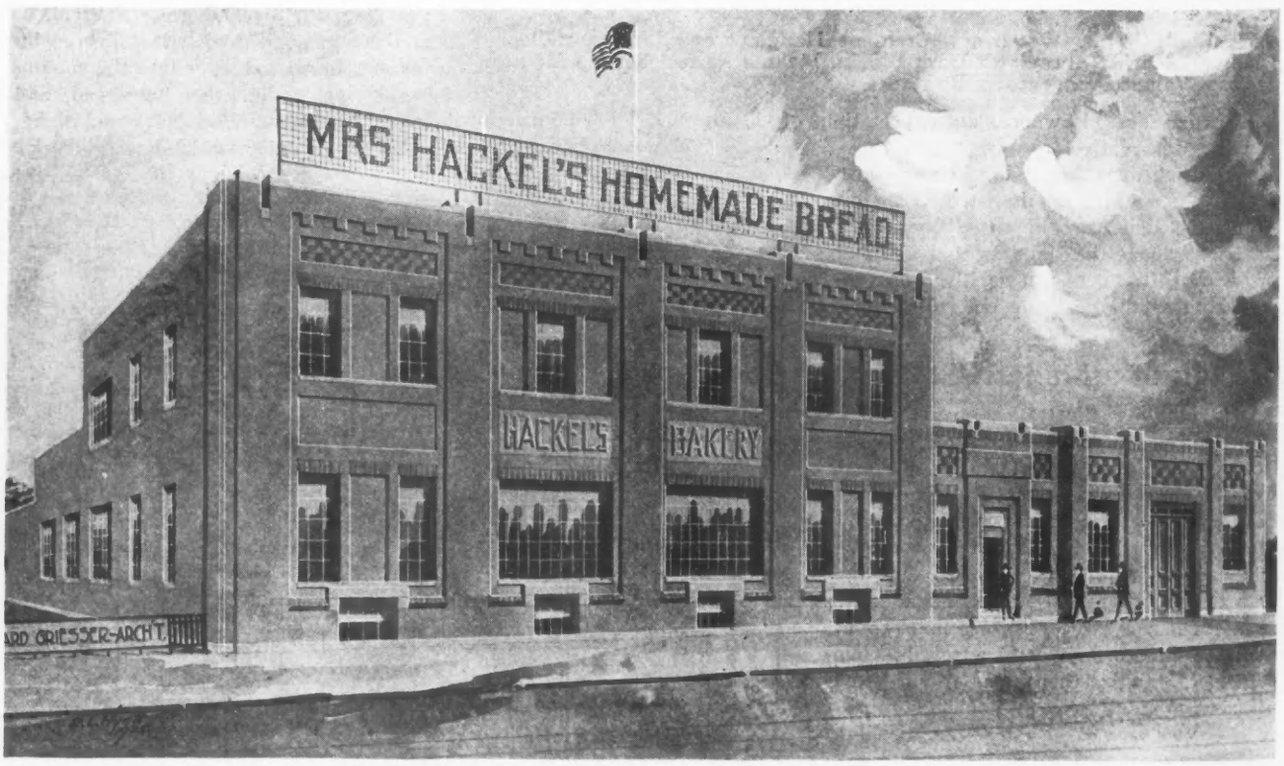
The operation and handling of the dough is done by machines. It is then put in pans and the pans are put on racks and are delivered into the proofbox which is heated with saturated steam at a temperature of about 90 degrees Fahrnheit and which remain in this proofbox for about 30 minutes. This is the last process of the dough. From here the pans are peeled into the four brick bake ovens. These ovens are fired from the rear with coke and kept at a temperature of about 500 to 600 degrees Fahrenheit. After the bread is baked it is delivered by means of a bread conveyor into the cooling and shipping room, then wrapped and loaded into the different trucks standing in the adjoining garage, which is one story high and accommodates 14 trucks.



A Cosy Bedroom Is Achieved in the Attic by the Use of Tan Papered Walls with a Small Floral Design, Walnut Furniture and a Green Fabric Rug on a Linoleum Floor of Tan Matting Effect With a Neat Floral Motif.

Design of a Modern Bakery





This Modern Bakery Plant Was Designed by Richard Griesser, Architect, of Chicago, and Is Being Built at No. 6347 Harper Avenue, Chicago. It is said to be "the last word" in Bakerydom.

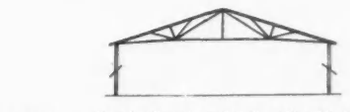
Features of Industrial Buildings

ROOF trusses, roof coverings, steel ventilating sash and skylights are important features of modern industrial buildings. Steel trusses of the types illustrated below may be obtained from several manufacturers of standard sizes and designs and having proper strength to support standard roof loads for the spans shown.

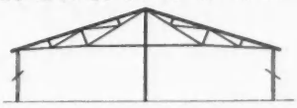
Any additional loads on the trusses, such as shafting, hangers, conveyors and their maximum loads, must be added to the normal roof and snow loads before trusses of the proper size can be selected.

It is usually advisable to decide on the number and size of roof trusses required before working out the detail of the side walls. Piers will be necessary in brick walls, to carry the trusses, and their spacing will, of course, be governed by the truss design. The size and location of the sash, in turn, will be affected by the location of these piers.

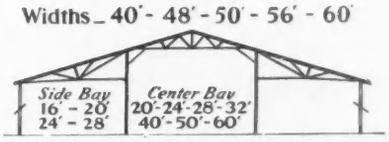
It has been found, from actual experience, that, when ventilating sash are installed, there is far less glass breakage. Otherwise, the workmen are apt to break many panes of glass, for relief from the heat.



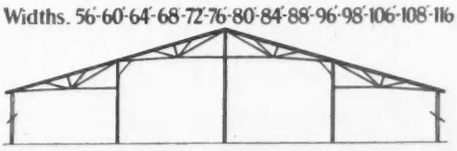
Widths _ 8'-12'-16'-20'-24'-28'-32'-40'-48'-50'-60'



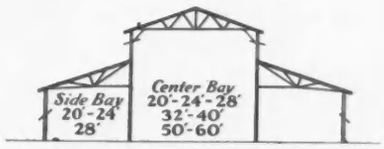
Widths _ 40' - 48' - 50' - 56' - 60'



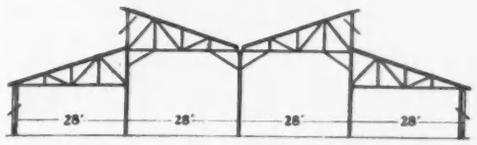
Widths. 56'-60'-64'-68'-72'-76'-80'-84'-88'-96'-98'-106'-108'-116'



Widths _ 80'-100'-112' *(4 Bays @ 20'-25' or 28')*



Widths 60'-64'-68'-72'-76'-80'-84'-88'-90'-96'-98'-100'-106'-108'-116'
Lengths _ Multiples of 4'-0"



Width 112 Lengths Multiples of 20'



SAWTOOTH
Widths _ Any Multiple of 28'-0"
Lengths _ Multiples of 2'-0"



This Is a Typical Industrial Building with Steel Roof Trusses, Skylights, Roof Tile and Steel Ventilating Sash. All weights suspended from roof trusses, such as the conveyors shown, must be added to the roof load and stated to the truss designer.

Design of Modern Store Fronts

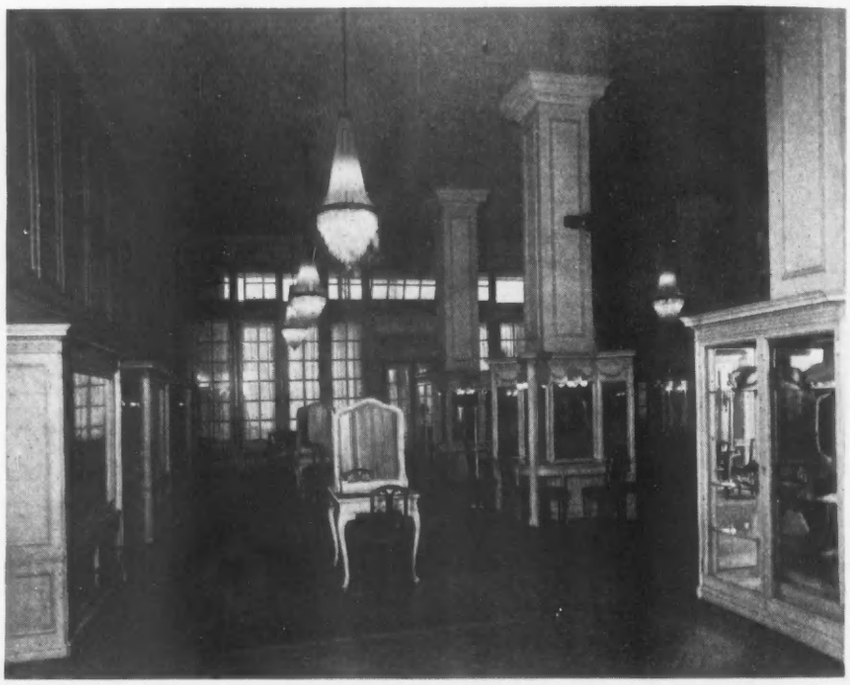
And the Merchandising Ideas Which Should Govern

By R. D. SCAMEHORN

IT is quite apparent that more consideration and thought is being directed toward retail merchandising store fronts today than ever in the history of store building construction. The modern merchant has learned from observation and experience that well designed and proportioned show windows are a valuable asset to his sales organization. The general contractor also realizes that the merchant is much more exacting in his display window requirements due to the fact that if his store front is correctly designed his sales will be proportionately greater. The contractor has also learned that a small quantity of copper store front material and a few pieces of plate glass will not suffice for a display window unless this material is so arranged that it will develop into a sales producing store front.

With these facts, it is very important to consider that the first requisite in store front designing of today is correct proportion as it should be applied to fit the merchandising requirements of that particular store.

The store front in its entirety should attract and maintain favorable attention from the passing public and should be temptingly trimmed with merchandise that will correctly fit the display space and create in the prospective customer's mind a desire to possess the article displayed. It is essential then that the entire front should be balanced. In other



Fine Interior of a High Class Millinery Shop in New York City. Note the parquetry flooring, the beautiful chandeliers and the enameled woodwork and fixtures.



The Value of Special Window Flood Lighting Is Clearly Shown in This Striking Window Display in Fresno, California.



One Side of an Island Show Case Entrance with Illuminated Glass Sign Above. Note the unimpeded vision through the clear plate glass of these windows.



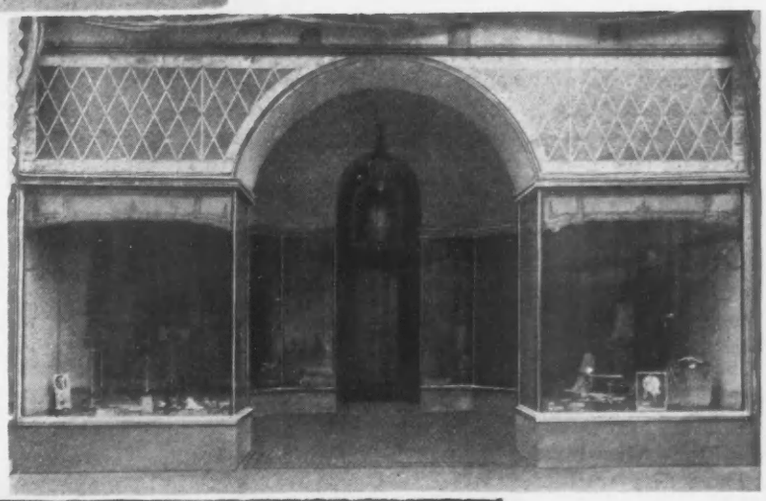
This Store Front Has a Very Low Bulkhead Intended for the Effective Display of Dresses on Mannequins. Copper mouldings, awnings and prism transom glass add to the modish effect.

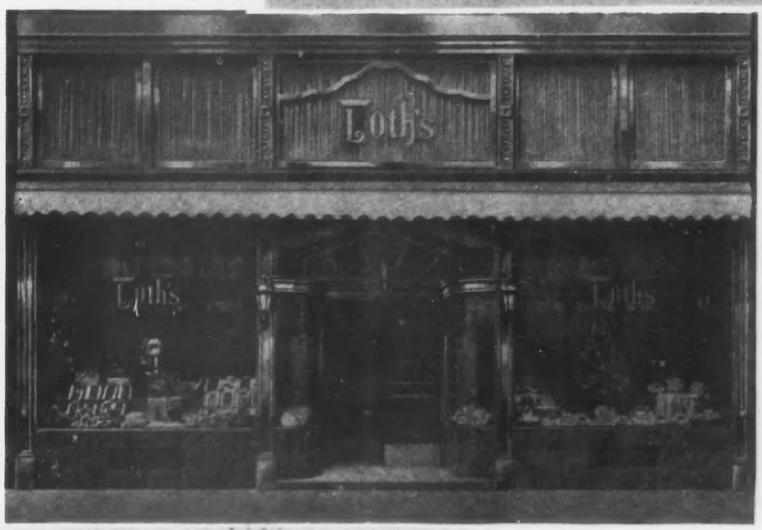
words, the whole thing must first of all be pleasing to the eye.

Occasionally one will see a building erected with several small shops, the store fronts of which are all exactly alike. Of course these have been designed in the general scheme of the building but it is a question if this is a good practice. In a case of this kind, several lines of merchandise would be represented, and the fronts being all alike, much individuality is lost. Undoubtedly, in a majority of cases the merchandise displayed would lose sales effect for the reason that the front was out of proportion for that class of merchandise.

Again, one will see another building with a number of shops in which practically all of the fronts are designed differently. It is apparent that considerable thought has been given to the store fronts in that the store rooms have been leased or the class of merchandise to be sold in the store room has been decided before the fronts were completed. When this method is adopted it is reasonable to expect that the enterprise will succeed.

If one will further observe, the materials entering into store front construction today is of a much higher quality than that used years ago. The reason for this is that that particular business or store must attract attention and to do so properly it must be constructed of materials that are beautiful and enduring. Copper or bronze panels, terra cotta, brick, marble and tile are commonly used to cover the exterior of the show window bulkheads as wood panels are not so enduring and require occasional attention.





Above: An Arched Store Front Construction Which Is Extremely Effective Is Shown Above. The archway is wide and inviting to window shoppers leading them logically to the store entrance.

At Left: Distinctive Individuality and Class Appear in This Store Front for a Confectionery Shop. It is ornate in the extreme.



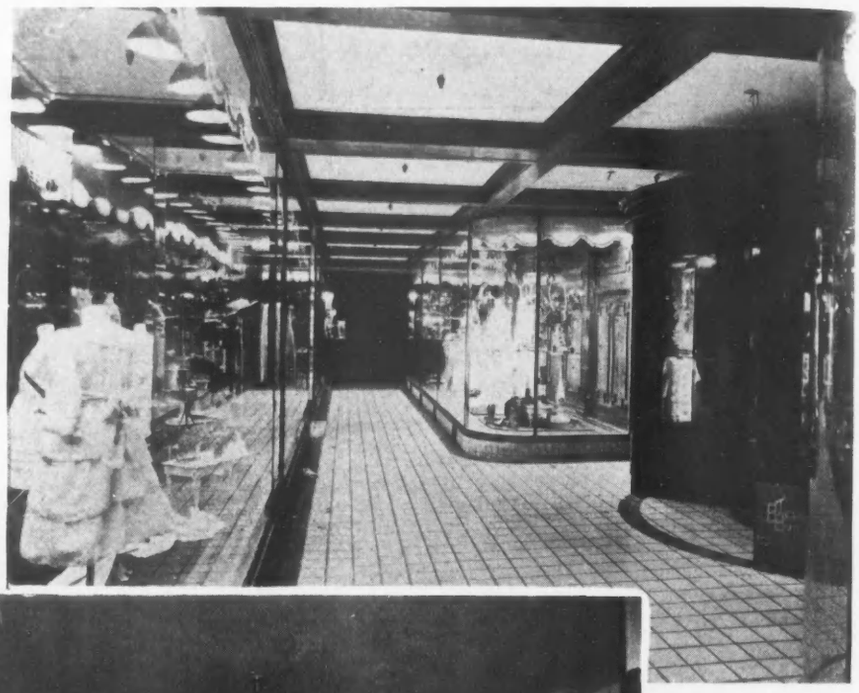
Wide and Expansive Store Fronts Are Required for Automobile Sales Agencies. In order to afford full vision, the bulkhead is but a few inches in height.

Bulkhead heights vary owing to the demands of various kinds of merchandise to be displayed. Furniture and automobiles or large objects require a low bulkhead from 8 to 12 inches, while jewelry could be displayed to the best advantage using a bulkhead height of 36 to 42 inches. Wood settings for plate glass are seldom used because of the short life of wood material and in its place copper settings are quite extensively used. This copper setting retains the plate glass in position by yielding members. Drainage of the plate glass is also provided for through weep holes in the gutter which permit the condensation from within

to pass out under the plate glass.

Various treatments are used above the plate glass line in the transoms and some beautiful effects are produced with vaulted ceilings, art glass and obscure glass. These various treatments when properly handled are very effective as a part of the store front. However, such treatment should be held somewhat in subjection as one should not detract too much from the merchandise display, for after all, the merchant's big concern is to sell merchandise.

In many of the modern store front installations, thought has been given to the window shopper, both during business hours and after closing time. This has been accomplished and is quite successful by reducing the width of the plate glass directly facing the sidewalk and increasing the width and depth of the vestibule, creating a store front lobby where prospective customers may enter and window shop unmolested from the usual bustling crowds on the sidewalk. These deep vestibules of course apply only to certain lines of merchandise, and again proper proportion must be considered in this type of front as well as in all others.





Above: Entrance and Window Display of Lowenstein Department Store, Memphis, Tennessee. The entrance is floored with non-slip tile.

At Left: The View at the Left Shows the Attractive Appearance of a New York Florist Shop, with Its Flooring of Rubber Tile.



Besides an Attractive Store Front with Island Show Case, This Store of Adler Brothers, South Bend, Indiana, Has an Illuminated Glass Marquise.

Show window lighting is necessary and should have consideration. A well designed store front will lose much of its selling power if poorly illuminated. Many sales are made through show window display after business hours. It is therefore quite essential that proper lighting be given special attention.

As there are thousands of buildings in this country with old type store fronts it appears that there is a fertile field for the contractor in store front remodeling.

Builders can secure, without extra charge, valuable co-operation from store front manufacturers. Practically all these manufacturers maintain designing staffs of experts who will study each store front problem submitted and furnish, without charge, designs, sketches and suggestions to fit each individual need.

Modern Store Fronts

Their Design, Construction and Influence on Retail Trade

By J. J. ARNSFIELD

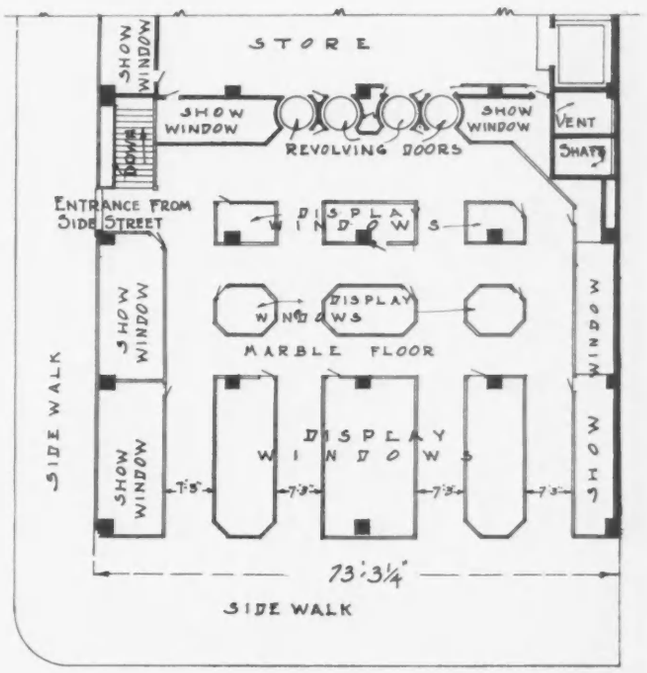
EVERY builder, contractor, and owner is as interested in the commercial success of the stores which may be included in his projects as he is in the mechanical details of the store front itself.

From a purely technical viewpoint, he fully appreciates today the necessity for extreme simplicity in the construction, both from the angle of appearance and from the ease of installing the store front and glass. Aside from permanent architectural beauty, so desirable in any installation, and the necessary provision for proper ventilation and drainage, an important factor is economy in installation.

From the standpoint of the influence of a good store front on the commercial success of the store, there is a growing tendency to regard the front of the store, the show windows, as the responsible factor for a large percentage of the store's business, and to treat it accordingly.

"Great progress has been noted," says a prominent window display manager for a nationally known chain-store organization, "in the style and type of store display spaces, attributed largely to the general advancement in merchandising methods, with a corresponding development in the appreciation of display as a power in sales stimulation." Two factors are responsible for attracting passers by. The first is the actual merchandise in the windows; the second is the appearance of the front of the store.

To justify expense, the modern store front must arrest the eye and attract the favorable attention of those who might otherwise pass it. To get the proper results, several elements must be taken into consideration, the most import-



Floor Plan of Island Show Cases at the Frank and Seder Department Store Main Entrance, Philadelphia.



Main Entrance of Frank and Seder Department Store, Philadelphia. A wonderful display of merchandise attracts passersby into this store. The entrance plan above shows the arrangement of these island show cases.

ant of which is the arrangement of the display units.

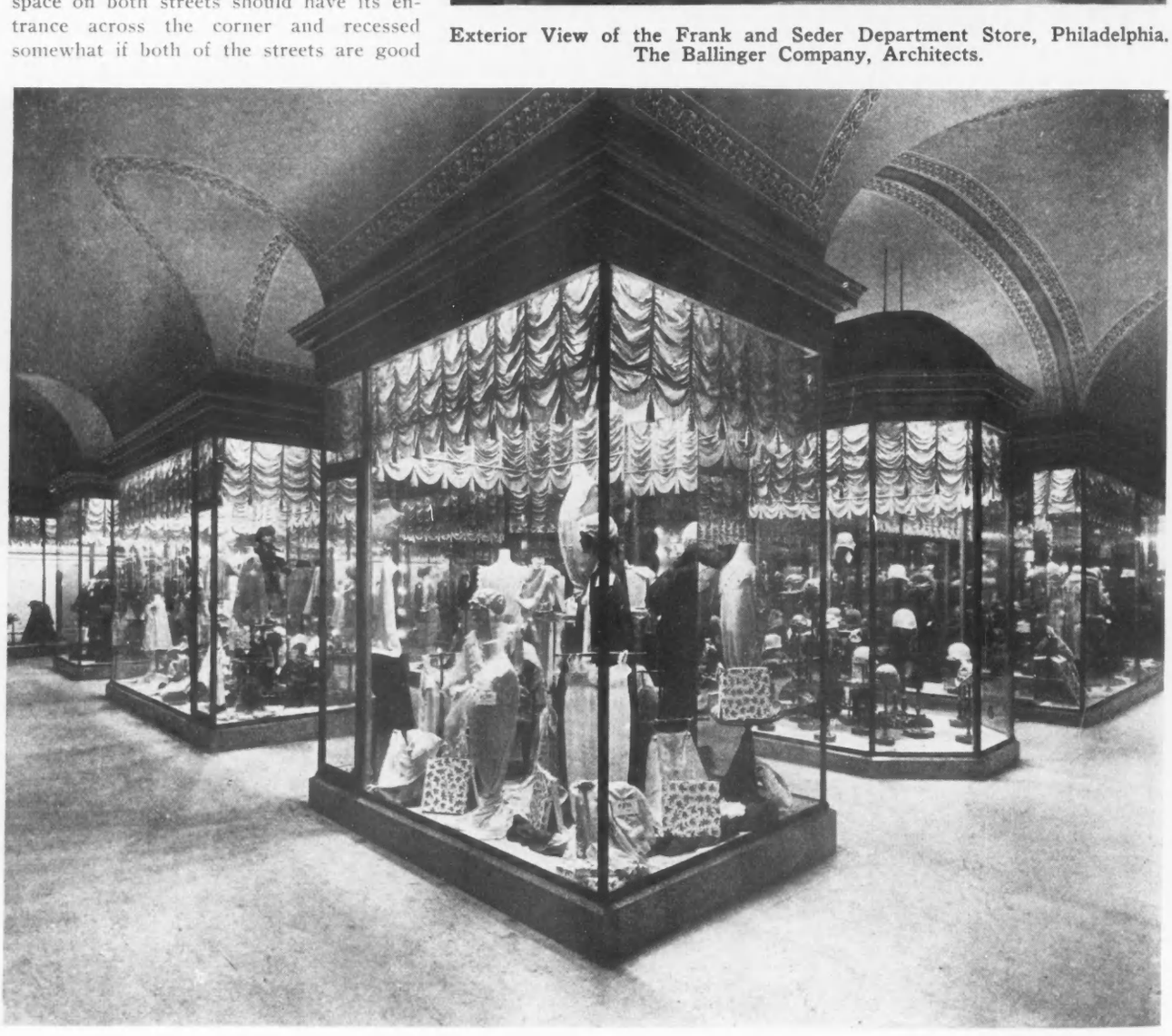
Regardless of the location of a store, whether it is on a corner, in the middle of a block, alongside a stairway entrance, on small or large frontage, there are always certain opportunities for that store to make itself distinctive from an outside appearance standpoint and to make the windows exercise their maximum trade pulling power.

The location of the entrance is most important. You will find many stores with the entrance practically hidden behind outside show cases, or off to one side, so that it is not easily located. The entrance should always be placed so that once the interest of the passerby is secured, the eyes will be drawn without interruption to the excellent line of the display, stopping logically at the entrance of the store. Many fronts are so cleverly designed that the customer finds himself right at the entrance before he realizes that he has left the sidewalk.

A corner store with window display space on both streets should have its entrance across the corner and recessed somewhat if both of the streets are good



Exterior View of the Frank and Seder Department Store, Philadelphia. The Ballinger Company, Architects.



Another View of the Island Show Cases in the Entrance to the Frank and Seder Department Store, Philadelphia. Note the attractive domed ceilings and the tiled floor with non-slip surface.

business streets. If one of the streets is a side street, this presents a different problem and it is necessary to study the location, the habits of the passersby, and the various factors entering into laying out the floor plan.

Very often a corner store is better off by having two entrances, depending upon the surroundings, to influence the placing of the entrances. Occasionally a corner entrance and a less conspicuous side entrance are advisable.

The narrow, although deep, store has a splendid opportunity to get window display space that is very much in excess of the actual front footage of the store by recessing the entrance and providing properly slanted show cases.

If the store is wide enough to have an "island" show case this will be found to be an outstanding feaure. The island serves to form a pivot display around which prospective buyers circulate, thus viewing the entire display while gradually getting nearer to the double swinging doors leading into the store.

Two entrances on a wide frontage are highly desirable, not only for the convenience in handling crowds but also because of the better arrangement made possible for the inside of the store.

A store in Ohio gets splendid effect from its arched front by having indirect lights reflecting their rays from the arch.

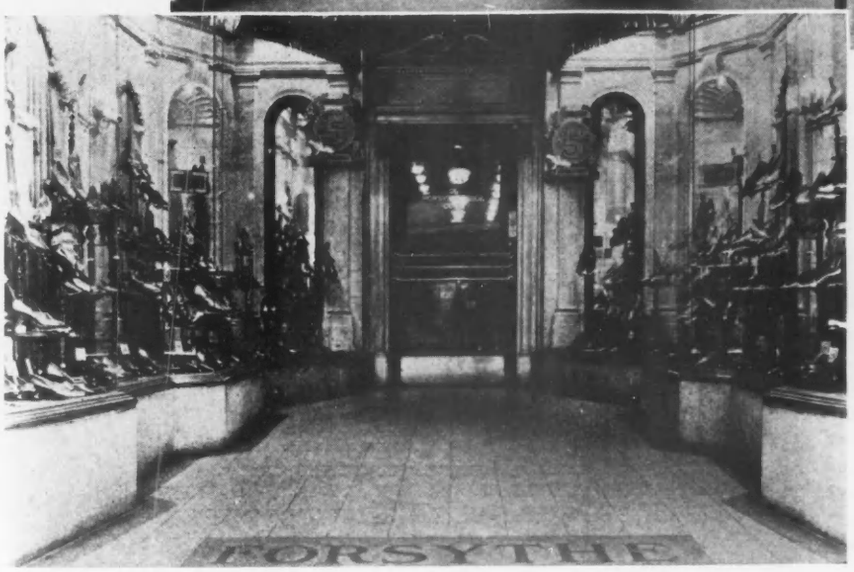
It is usually a problem to discover all the opportunities presented for making the most of any given location. Only an expert can do it, that is, some one who knows the store front business as well as merchandising. Realizing this, a number of the leading store front manufacturers maintain service departments for the purpose of drawing up suggestions and submitting attractive designs to fit the requirements of any individual business. This service is free of charge to any one interested.



The Attractive Store Front Shown Above Adds the Prestige of Fine Jewelry to the Tobacco Pipes Displayed.



At Left — Note the Fine Skylight Illumination in the Dry Goods Store of Meyer, Siegel and Company, Fresno, California.



Display Windows of the Forsythe Shoe Company, Cleveland, Ohio. The sloping entrance to this store is floored with non-slip tile. The border and the name have been laid in tile of contrasting shades.

Building Against Fire Hazards

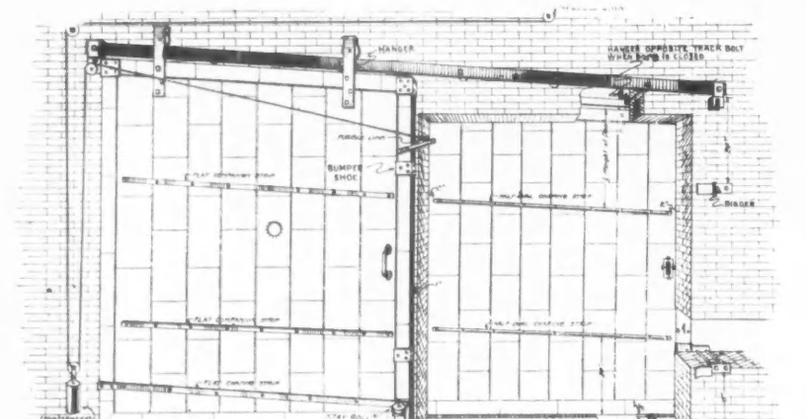
Proper Construction Will Reduce the Danger and the Cost of Insurance

By ELSIE L. CULVER

THAT it is a good deal better to ask questions first than to pay premiums later is the big idea that Carl H. Sachs, engineer of the western department of the National Fire Insurance Company, of Hartford, Conn., is trying to put over with the insuring public.

For instance, Mr. Sachs points out the question of undivided floor space. The standard is 1,000 square feet—that is, there is a penalty for undivided floor spaces of any greater area. Concerns insuring with this company have been able to reduce their insurance premiums as much as 90 per cent by installing fireproof doors dividing larger areas.

Installing the doors paid of course, in the saving on insurance premiums, besides furnishing additional protection in case fire actually did occur. But much more might have been saved if the company had investigated the matter of fire hazards before building and either divided their floor areas or put in the fire doors in the process of constructing the building.



Fire Doors, Dividing Large Areas, Mean a Greatly Reduced Fire Risk and Insurance Premiums. An installation of the sliding type is shown here.

Floor openings, which include everything from clothes chutes to stairways and elevator shafts, are another fire hazard which is not generally appreciated. As a matter of fact, the floor openings not properly protected and large undivided floor areas probably cause the worst losses insurance companies are called on to reimburse. Consequently, the penalty for such openings is high.

Many men, not realizing this, either leave the openings entirely unprotected when they build or put in fire doors of a lighter material than the floor itself, whereas the insurance companies demand that they have at least the same resistance to fire. Later, of course, when the time comes to insure his building, the owner will find himself with the choice of tearing out these unsatisfactory protections and installing more substantial ones at an unwelcome expense, or paying an even less welcome high rate of insurance.

Wall openings in an outside wall are classed as a hazard. But, in closing up such openings, it is often next to impossible to get the bricklayer to take out alternate bricks from the adjoining side wall and by thus reinforcing, make the closed up opening as strong as the wall itself.

The point is this: a building in the eyes of an insurance man must be judged by its weakest spot. One section of unsatisfactory foundation, a frame lean-to on a good brick building, a flimsy door in a good partition or a skylight (not properly protected by screen and metal frame) in an otherwise satisfactory roof, are enough to appreciably heighten the insurance rate.

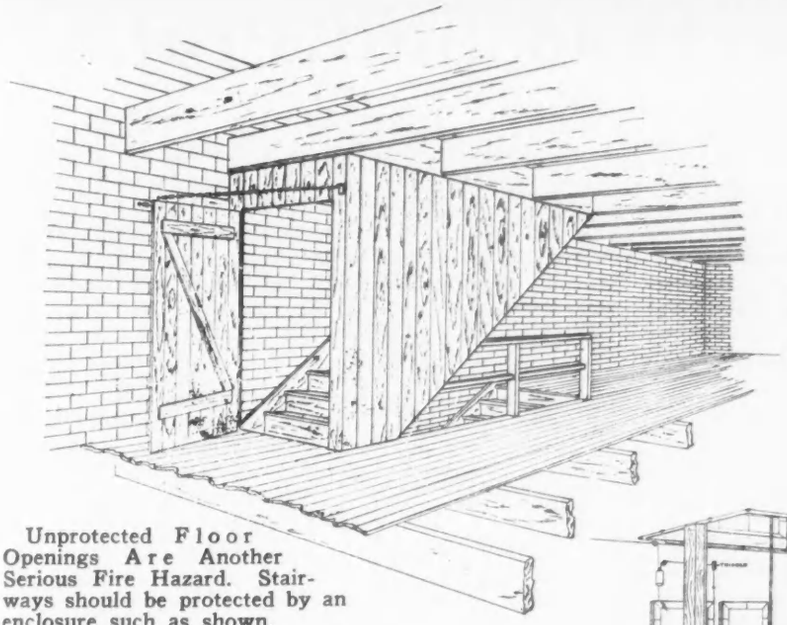
"Don't business men know about the difference these fire hazards make?" we asked Mr. Sachs.

"Yes, in a general way. They know that failure to take certain precautions will increase their rate and that there are certain improvements they could put in which would lower it to some extent. But I have yet to adjust a loss where the owner knew all that he should have known about the insurance question.

"What is to be done about it? Well, as long as we can't all be insurance experts, about the best plan is to consult someone who is an authority on the subject before you build. Don't depend upon a contractor. As a rule, he is familiar with the ordinary requirements of the insurance companies. However, it is often not wise to rely too much upon him. But it is to the interest of the insurance companies as well as to



Not All Fire Hazards Are the Result of Faulty Construction. This loft over a theater auditorium, with ashes, rags, paper and rubbish littered over the floor is a serious fire hazard.



Unprotected Floor Openings Are Another Serious Fire Hazard. Stairways should be protected by an enclosure such as shown.

that of the owner of the building to prevent fire losses.

"The insurance companies have studied the matter from every angle and their local representatives are always willing to give every possible bit of advice to the prospective builder. In the case of large structures, representatives are frequently sent out direct from the main offices to suggest methods of lowering fire hazards and incidentally insurance rates. It is a service any reputable insurance company is glad to give, and failure to take advantage of it is apt to prove costly and disappointing to the builder."

Here is a list of things to look out for in building, if you want to get off easy on the insurance rates. This list is for the standard brick industrial building:

Undivided floor space of over 1,000 square feet.

Walls below standard thickness (12 inches is the standard for one or two story buildings).

Parapets under 18 inches high on two-story or under 36 inches high on taller buildings.

Poor foundation material in either main building or addition.

Unplastered ceilings and walls.

Skylights unless wire glass in metal.

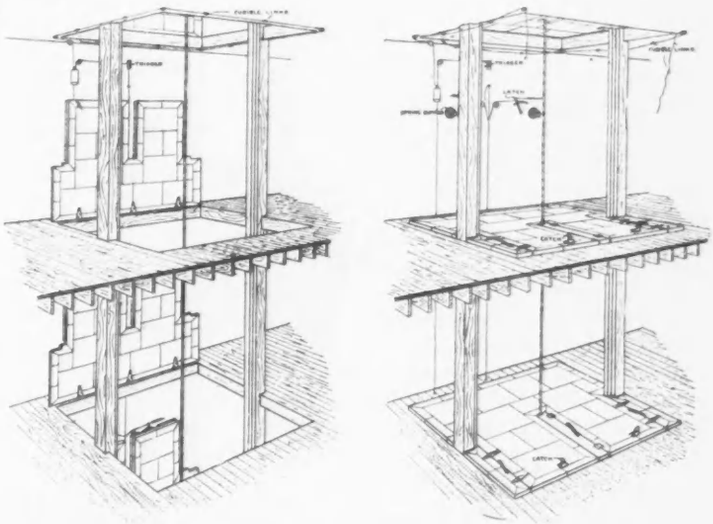
Uncovered light shafts, courts, etc.

Floor openings (shafts, stairways, etc.), unless protected at each floor with material as good as the floor itself.

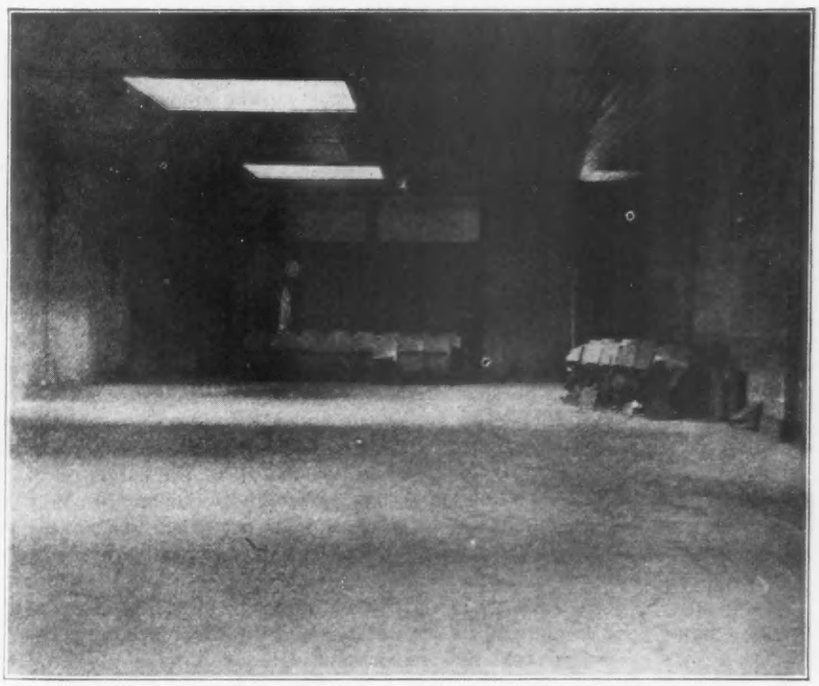
Chimneys other than brick or which do not rest on the ground.

Stovepipes piercing partitions of combustible substance.

Radiators, electric bulbs, etc., without sufficient clearance.



Insurance Companies Demand That Floor Openings Shall Have Protection with Fire Resistance at Least Equal to the Resistance of the Floor Itself.



The Same Theater Loft Shown on the Opposite Page Was Cleaned Up After the State Fire Prevention Association Had Pointed Out the Danger and, with Good Housekeeping, the Hazard Was Materially Reduced.

Attachments — Outside wooden stairs, cornices attached to adjoining building, roof houses, platforms, etc.

Exposure—from adjoining brick building less than 20 feet away or frame building less than 40 feet away.

"After exposures" are defects usually easy to remedy and with unusually high hazard. Consequently they draw an unusually high penalty. They include:

Exposed electric wires.

Use of gas tubing instead of pipe.

Absence of "No Smoking" signs, etc.

On the other hand, here are a few of the points for which "credit" is given in figuring your rates:

Concrete floors.

Superior structural condition of floor, roof or partitions.

Standpipe and at least 75 feet of 1½-inch hose.

Fire escapes with landings at each floor.

Automatic alarms (released by heat).

Cask of water and pails conveniently placed.

Two and one-half gallon chemical extinguisher conveniently placed.

Watchman punching clock, especially if connected with central station.

Automatic sprinkler equipment.

Turning Overhead Into Profits

By W. V. SCHMIDT

TWENTIETH century business methods have increased the contractor's overhead cost until in many lines it is equal to or greater than direct labor or material costs.

Construction work today in any line follows a definite plan. All work is carefully mapped out before operations are begun. A quantity survey is made, material prices verified, the amount and cost of the required labor carefully estimated before a bid is submitted. To make an intelligent bid upon any piece of work, complete information as to the supply and cost of the material and labor must be gathered. Every possible saving of either is given careful thought and taken into consideration when making an estimate.

One result of this is that construction work today is carried on with more efficiency than ever before. Because of the competition on a job or contract of any consequence it is imperative that the contractor plan carefully and be certain of his costs before submitting his bid, if he is to secure the contract and make a profit on it.

The expense of this preliminary work on a contract is the same, whether or not the contractor is the successful bidder. Thus while the amount of labor required is less and the material used is secured with greater care than in previous years, the cost of conducting the contracting business itself is increased Furthermore, there is no indication of any decrease in this cost of doing business. This cost will continue to increase as progressive methods call for more efficient construction work.

This is not an unnatural condition. It is a perfectly natural result of progress. Even with this increased cost of doing business, the actual cost of construction is much less than it would be with the use of former methods.

Efficiency and economy make for increased construction work. The return of the wasteful cost plus method of a few years ago would result in an alarming slump in the building industry.

This condition means that for a contractor to be successful he must be able to keep the pace. Unless he has a complete knowledge of all costs of construction work he is either going to be an unsuccessful bidder in far too many instances, or else he will be a successful bidder at a figure that leaves him no profit and perhaps represents a loss. There are thousands of contractors taking jobs at an actual loss and an alarming number fail in business each year.

A careful survey of conditions in the contracting business shows that of those who fail or suffer a loss, the majority do so because of their lack of knowledge of the cost of doing business; their inability to ascertain and properly apportion their overhead costs.

Great care is taken to list the exact cost of each item of material or labor required for a contract. Yet while exhausting all means to reduce these costs as much as possible, scant attention is paid to reduce overhead costs.

Many contractors who do figure overhead costs do not include under this heading the full amount of such costs. Few have any definite method of apportioning this overhead cost among the various contracts.

FORM 708

ESTIMATED INDIRECT EXPENSE FOR YEAR 1925

LIST OF EXPENSE ITEMS	YEARLY EXPENSE	MONTHLY EXPENSE	REMARKS
I FIXED ANNUAL			
1. Taxes on R. E. & Bldgs.	800 00	66 67	
2. Taxes due Federal Gov't.	1200 00	100 00	
3. Taxes due State	400 00	33 33	
4. Auto License	52 00	4 33	
5. Misc. Taxes & License	60 00	5 00	
6. Insurance	2100 00	175 00	
7. Trade Ass'n Costs	200 00	16 67	
8. Depreciation			
a. Bldgs, Tools & Mach.	5040 00	420 00	
b. Furniture & Fixtures	60 00	5 00	
c. Miscellaneous Trucks	840 00	70 00	
9. Interest on Capital	3600 00	300 00	
10. Repairs Mach + Tools	1200 00	100 00	
Bldg	150 00	12 50	
Trucks	360 00	30 00	
II CURRENT			
1. Rent	4800 00	400 00	
2. Light	300 00	25 00	
3. Heat	600 00	50 00	
4. Power	1800 00	150 00	
5. Salaries	24000 00	2000 00	
6. Postage	240 00	20 00	
7. Sta. & Office Supplies	180 00	15 00	
8. Telephones	240 00	20 00	
9. Telegrams	144 00	12 00	
10. Traveling Expense	180 00	15 00	
11. Drayage & Freight	180 00	15 00	
12. Shop Supplies	720 00	60 00	
13. Stable Expense	none	none	
14. Auto Expense	600 00	50 00	
III MISCELLANEOUS			
1. Charity	60 00	5 00	
2. Loss on Bad Accounts 1% sales	1620 00	135 00	
3. Legal Expense	60 00	5 00	
4. Claims & Ret. Goods	1500 00	125 00	
5. Interest & Discount	240 00	20 00	
6. Idle Hours of Direct Labor 5% labor	2100 00	175 00	
7. Advertising	1800 00	150 00	
8			
TOTAL	57426 00	4785 50	

Form 708 on Which Are Listed All Expenses Not Chargeable to Any Certain Job.

A contractor can, by following the method here described, ascertain the exact amount of his overhead cost and apportion it among the various contracts or jobs with the same degree of accuracy as he can measure the amount of labor required. To do this he does not require the services of an accountant for the method is quite simple and easily understood.

The first step is for the contractor to list all of his expenses for the year on a form such as No. 708.

Here you see practically all of the expenses the contractor will meet with that are not chargeable to any certain job. The amount of some of these items may vary considerably with different contractors, but every item is an indirect expense.

The amounts can be arrived at by referring to the record of the same expenses for the previous year. If a contractor has kept no record of such expenses, it is not difficult to estimate them. Estimating expenses for the year is usually less difficult than to estimate them for a week or a month.

Now let us take these items one at a time, and see what they are and how we shall arrive at the amount. The amount of such items as taxes, license, insurance, trade association costs are known and you have only to list them. Depreciation costs should be carefully figured as shown on Form 703. On this form you list all of the assets of your business. Buildings, machinery and equipment. In the first column you list the original cost price, in the second the age of the property in years, the next estimate its present value and in the next one the number of additional years of active use. With the total life of the building, machinery or equipment, its present age and the difference between its original cost and its present value you have the rate of yearly depreciation.

This record of depreciation costs will prove valuable to you in determining the amount of insurance necessary and in proving an insurance loss. It will also help you in

FORM 703

DEPRECIATION COSTS

NO.	PROPERTY DESCRIPTION	ORIGINAL COST PRICE	PRESENT AGE IN NUMBER OF YEARS	PRESENT VALUE ESTIMATED	ADDITIONAL YEARS OF ACTIVE USE	YEARLY RATE OF DEPRECIATION	AMOUNT OF YEARLY DEPRECIATION	AMOUNT OF MONTHLY DEPRECIATION
	Buildings: Office (Brick)	10000 00	approx 5	9000 00	approx 45	2%	200 00	16 66
	Plant (Wood)	20000 00	" 5	15000 00	" 15	6⅔%	1000 00	83 34
	Garage (Brick)	2000 00	" 3	1880 00	" 48	2½%	40 00	3 33
	Machinery:							
4	Heavy Type	10000 00	approx 4	6000 00	approx 6	16⅔%	1000 00	83 34
1	" "	2500 00	" 2	2000 00	" 8	12½%	250 00	20 83
2	" "	4500 00	" 1	4050 00	" 9	11%	450 00	37 50
2	Medium "	2000 00	" 4	1000 00	" 4	25%	250 00	20 83
5	Light "	2500 00	" 3	1000 00	" 2	50%	500 00	41 66
	Misc. Equipment	1000 00	" 3	400 00	" 2	50%	200 00	16 66
	"	2000 00	" 2	1200 00	" 3	33⅓%	400 00	33 34
	Shafting Belting & Pulleys	1500 00	" 4	900 00	" 6	16⅔%	150 00	12 50
	Boiler	2000 00	" 4	1000 00	" 4	25%	250 00	20 83
	Office Equipment	1200 00	" 4	none	" 2	none	none	none
	Merchandise	50000 00	Inventd once promptly in most cases			1%	500 00	41 67
1	Truck (2 ton)	3500 00	1	2625 00	3	33⅓%	875 00	72 92
1	Truck (1 ton)	1100 00	2	550 00	2	50%	275 00	22 92
	TOTALS							

Form 703 on Which Depreciation Costs Should Be Carefully Figured on All the Assets of the Business.

making out your tax reports and substantiating your statements.

Next on the list is interest on capital. Interest on capital invested in the business is an item that many do not consider an expense. Believing that only such amounts as are paid on borrowed money is an interest expense.

In order to know the actual earnings of your business as a contracting business, it is necessary to know the profit it has made over and above such amount as you can realize by investing your money with perfect safety in first mortgages on real estate, or bonds. If you were to sell your business tomorrow you could invest the money at from 5 to 6 per cent with perfect safety. No effort whatever would be required to assure that return. The money itself earns that much and that amount must be charged to the business before you know what it has earned as a contracting business.

When estimating repairs you know in advance certain repairs that will be necessary on the buildings and some of the machinery. Others are made from time to time and in estimating them a close check can be made by comparing the estimate with the actual cost of your repairs each month.

Rent is an expense that is known in advance and you have only to list it. If you occupy your own building you should charge the business with the same amount of rent that you would receive if you rented it to a tenant. Where an entire building is occupied and owned by the contractor it is better to take care of this by charging interest on the investment and charge the business with the annual depreciation and repairs.

Light, heat and power can be estimated quite accurately. Salaries included in overhead costs do not include wages paid for shop or productive labor. Only such salaries as managers, foreman (if employed as foreman only and not in actual productive work) and the office help. If you, as an owner of the business, are devoting your time to its management you should charge the business with a salary for yourself at the same rate you would have to pay another man to manage it with the same degree of efficiency.

The rest of the current expense, postage, traveling expense and automobile expense, can be estimated with a fair degree of accuracy. Miscellaneous expenses, legal expenses and claims and returned goods would be estimated also by your interest and discount.

Then you have idle hours of labor. This represents an indirect expense that is perhaps the most elusive of all. Unless you give careful attention to this item it is going to subtract a surprisingly large amount from your profits each year.

It is doubtful if there is a contractor employing labor who does not find that there are several hours of each man's time each week that cannot be properly charged to any certain contract, or job. In some lines of business as much as 20 per cent of the labor cost cannot be charged directly to contracts.

Some contractors who are employing union labor by the hour and pay for only such time as is actually put in on a certain job have little trouble with this expense item. Others, however, employ men by the day or week, paying for the labor whether productive or non-productive. Unless they class this non-productive labor charge along with the rest of the operating expenses it represents a loss that reduces the profits.

An accurate and practical method is to charge all labor

FORM 706

IDLE HOURS OF LABOR

MONTH	AMOUNT PAID FOR LABOR	AMOUNT CHARGED TO CONTRACT	DIFFERENCE PAYMENT LESS CHGS.	AMOUNT CHARGED TO OTHER EXPENSE	COST OF IDLE HRS. FOR MONTH		
JANUARY	2840 00	2635 00	205 00	95 00	110 00	Business above av. dep.	
FEBRUARY	2810 00	2670 00	140 00	20 00	120 00	"	"
TO DATE	5650 00	5305 00	345 00	115 00	230 00		
MARCH	2975 00	2725 00	250 00	115 00	135 00	Took some labor out where	
TO DATE	8625 00	8030 00	595 00	230 00	365 00		
APRIL	3325 00	3050 00	275 00	125 00	150 00	confusion in dep. more men	
TO DATE	11950 00	11080 00	870 00	355 00	515 00	men used to unload goods	
MAY	3715 00	3610 00	105 00	75 00	30 00	Things running smoothly	
TO DATE	15665 00	14690 00	975 00	430 00	545 00		
JUNE	3850 00	3635 00	215 00	90 00	125 00	Delays on two jobs	
TO DATE	19515 00	18325 00	1190 00	520 00	670 00		
JULY	3790 00	3690 00	100 00	50 00	50 00	Used common labor	
TO DATE	23305 00	22015 00	1290 00	570 00	720 00	for unloading	
AUGUST	3815 00	3705 00	110 00	55 00	55 00	Hours differ to charges	
TO DATE	27120 00	25720 00	1400 00	625 00	775 00	on tools	
SEPTEMBER	3250 00	3010 00	240 00	95 00	145 00	Work slackened up Many	
TO DATE						on uniformly busy	
OCTOBER							
TO DATE							
NOVEMBER							
TO DATE							
DECEMBER							
TO DATE							
FIRST 6 MONTHS							
LAST 6 MONTHS							
GRAND TOTAL							

Form 706 for Recording Idle Hours of Labor, Those Not Chargeable to Any Certain Job Are Charged to Overhead.

payments in excess of that chargeable directly to the contract to overhead expense under the heading of idle hours of labor.

The proper use of a time card will show exactly how much of the time you are paying for is productive and how much must be considered overhead expense. This time card should show the employe's name, the date and space for the job number, a brief description of the work done and the exact amount of time spent on it.

When workmen account for their time not chargeable to a contract it is well to insist upon their being specific, especially when reporting time making repairs. It is a common practice to account for any inactive time under the general heading of "repairs." It would be better that they report a part of this time as spent in actual idleness. You would then have the exact cost for your various repairs and know whether certain ones were justified or whether it would be better to discard the machine or equipment repaired and purchase new.

FORM 712

ESTIMATE SHEET

ESTIMATE NO. 2342 NAME Henry E Stevens ADDRESS 2112 Grand St DATE 8-3-2.

DESCRIPTION OF JOB One story brick garage as per plans and specifications

MATERIAL				LABOR				SPECIAL EXPENSE	
NO. OR WEIGHT	DESCRIPTION	PRICE	AMOUNT	HRS	OPERATION	RATE	AMOUNT	ITEM	AMOUNT
	Concrete			24	Concrete	87½	2100	Hauling	5000
12 T.	Sand	205	2460	64	Granitoid	87½	5600	Use of Mixer	4500
23 T.	Gravel	230	5290	24	Forms	150	3600	Permits	2000
120 Sx.	Cement	80	9600	212	Bricklayers	175	54600	Insurance	8300
	Granitoid			356	Hod Carriers	115	40940		
28 T.	Sand	205	5740	84	Commonlabor	75	6300		
55 T.	Gravel	230	12650	198	Excavation	75	14850		
222 Sx.	Cement	80	17760	184	Carpentry	150	27600	TOTAL	19800

INDIRECT EXPENSE		
NO. HRS.	OVERHEAD RATE PER HOUR	AMOUNT
1246	.32	39872

SUMMARY OF COSTS	
DETAILS	AMOUNT
MATERIAL	23820
LABOR	155590
SPECIAL EXPENSE	19800
INDIRECT EXPENSE	39872
TOTAL COST	453282
10 % PROFIT DESIRED	50375
QUOTATION	503657
ACCEPTED DATE	

894	Fdn. Lumber	395	3511						
3514	Brick	2000	70000						
28	Sand	230	6440						
87 bu	Lime	65	5655						
70 Sx.	Cement	80	5600						
	Lumber								
2700	1x8"2 YP	3400	9180						
3400	2x10 Joists 18'	4200	14280						
800	8x12 Beams	3950	3160						
672	6x8 Columns	3950	26544						
	Millwork Bid		23700						
25 sq	Comp. Roofing Bid		20900						
12	3x3x¼ Lintels Bid		1640						
	Painting Bid		8200						
	Glass + Glazing Bid		9700						
	TOTAL		23820	1246	TOTAL		155590		

Form 712 for Estimating and Quoting Lists the Estimated Amount and Cost of Material and Labor.

This card should be turned in at the end of each day and after being posted to the payroll sheet, posted to the contract sheet. In this way the various jobs will be charged with their respective labor payment daily, and it will be possible to tell whether the time estimated is being exceeded. If results are not in line with the estimates, greater effort can be insisted upon by the foreman, or other necessary steps can be taken to complete the work in accordance with the original estimate.

With this estimate of the yearly indirect expenses, you will have a permanent record, and one that will no doubt be a surprise to many. Dividing each item by 12 and totaling gives you the estimated amount of the monthly indirect expense. A check on this estimate should be made by comparing it with the actual expense for each month.

Having the total indirect expense for the month, it must be properly apportioned to each job. To do this one must select something upon which to base the distribution. To be fair and equitable the basis must have a direct relation to the amount of the overhead expense. It must be that which actually controls the amount. Now, what is the basic factor that makes this monthly overhead just what it is? Some contractors believe that the amount of overhead is governed by the volume of business done, and apportion their overhead accordingly. Some say it is the amount of money paid for labor and others that it is the cost of material used. While each may have some slight effect upon the amount of overhead they could not be used as a basis because they vary without changing the overhead. The amount of overhead would be practically the same whether labor received 50c or $2.00 per hour, whether the material used was the most or least expensive. It would be practically the same whether the amount of business done for that month was a normal amount, or only half that much.

Your taxes, interest, rent, depreciation, salaries, insurance and the like the results of a period of time elapsed. The correct way, therefore, to apportion your overhead to contracts is upon a time basis.

If you secured a contract that occupied one month's time of your entire force it would be proper to charge the contract with the entire overhead expense for one month. But this rarely occurs. As a rule there are several jobs of various sizes being worked upon at the same time. To charge each with its proper share of overhead expense you must arrive at the rate of overhead expense per man, per hour—and this is quite simple.

(Continued to page 369.)

FORM 713

CONTRACT SHEET

ESTIMATE NO. 2342 CONTRACT NO. 926

NAME Henry E Stevens ADDRESS 2112 Grand St DATE 8-24-25

DESCRIPTION OF JOB One story brick garage as per plans and specifications

MATERIAL				LABOR				SPECIAL EXPENSE	
NO. OR WEIGHT	DESCRIPTION	PRICE	AMOUNT	HRS	OPERATION	RATE	AMOUNT	ITEM	AMOUNT
	Concrete			23	Concrete	87½	2012	Hauling	5000
12 T.	Sand	205	2460	66	Granitoid	87½	5775	Use of Mixer	4500
23 T.	Gravel	230	5290	25	Forms	150	3750	Permits	2000
120 Sx.	Cement	80	9600	310	Bricklaying	175	54250	Insurance	8300
	Granitoid			352	Hod Carriers	115	40480		
28 T.	Sand	205	5638	84	Commonlabor	75	6450		
54	Gravel	230	12420	204	Excavation	75	15300		
220	Cement	80	17600	182	Carpentry	150	27300	TOTAL	19800

INDIRECT EXPENSE		
NO. HRS.	OVERHEAD RATE PER HOUR	AMOUNT
1248	.32	39936

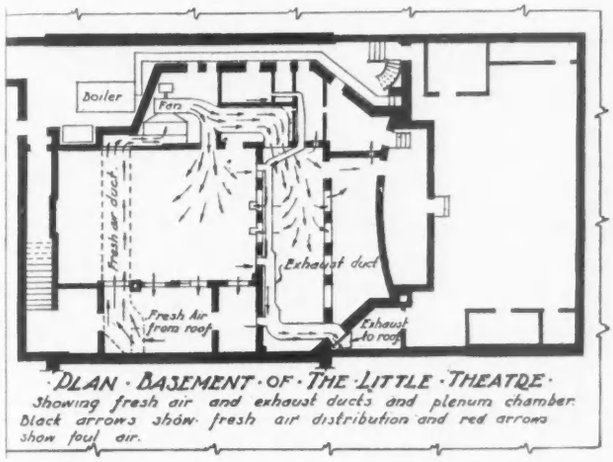
SUMMARY OF COSTS		
DETAILS	ESTIMATE	ACTUAL
MATERIAL	23820	27628
LABOR	155590	155318
SPECIAL EXPENSE	19800	19800
INDIRECT EXPENSE	39872	39936
TOTAL COST	453282	452682
QUOTATION	503657	503657
PROFIT	50375	51075
LOSS		

894	Fdn. Lumber	395	3511						
3514	Brick	2000	70000						
28	Sand	230	6440						
87 bu	Lime	65	5655						
70 Sx.	Cement	80	5600						
	Lumber								
2700	1x8"2 YP	3400	9180						
3400	2x10 Joists 18'	4200	14280						
800	8x12 Beams	3950	3160						
672	6x8 Columns	3950	26544						
	Millwork Bid		23700						
25 sq	Comp. Roof Bid		20900						
12	3x3x¼ Lintels Bid		1640						
	Painting Bid		8200						
	Glass + Glazing Bid		9700						
	TOTAL		23820	1248	TOTAL		155318		

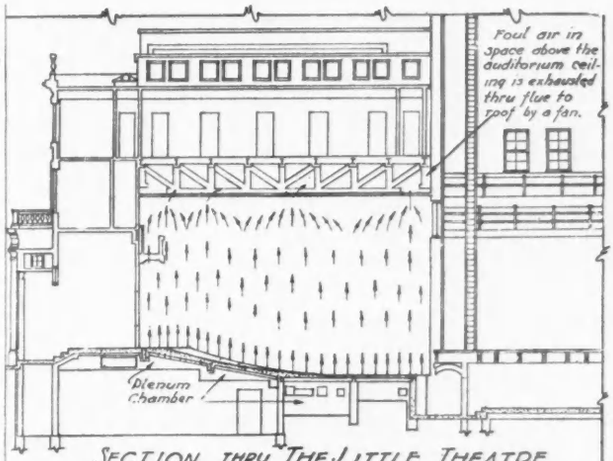
Fig. 713, on Which a Record of the Contract Is Kept, Serves as a Check on the Estimate.

Ventilation of Schools and Theaters

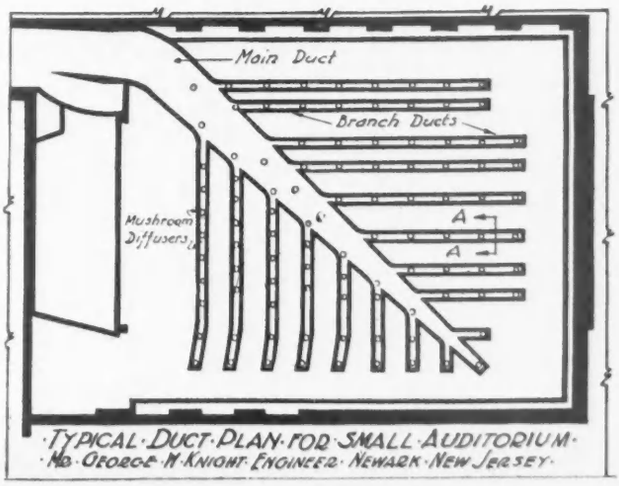
VENTILATION of school auditoriums and theaters is receiving more careful attention from designers today than ever before and the planning and location of air ducts is, therefore, a matter of great importance. The drawings reproduced herewith show the arrangement of air ducts in a typical high school auditorium and in a small theater. The installations selected as typical are those in the Schenley High School, Pittsburgh, and the Little Theater, New York City.



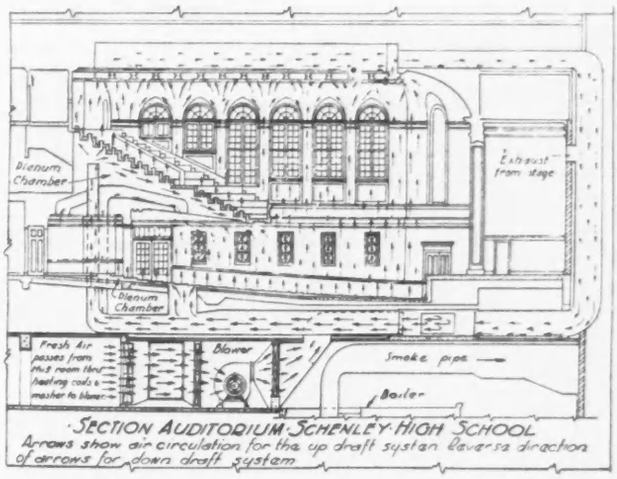
PLAN · BASEMENT · OF · THE · LITTLE · THEATRE ·
Showing fresh air and exhaust ducts and plenum chamber. Black arrows show fresh air distribution and red arrows show foul air.



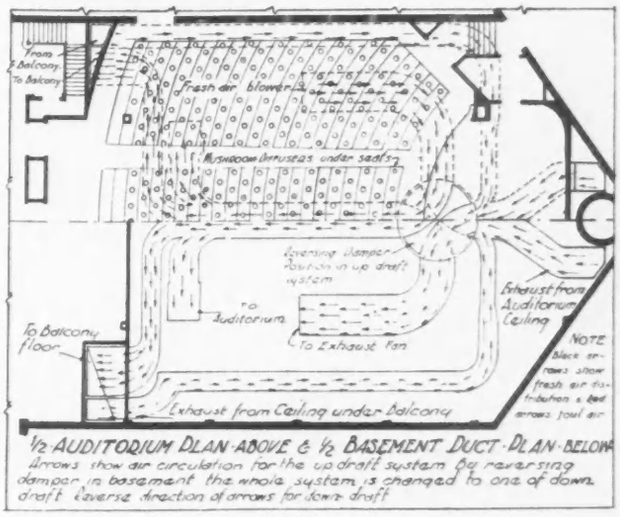
SECTION THRU THE LITTLE THEATRE
Air is admitted thru Mushroom Heads in floor, the foul air taken out at the ceiling



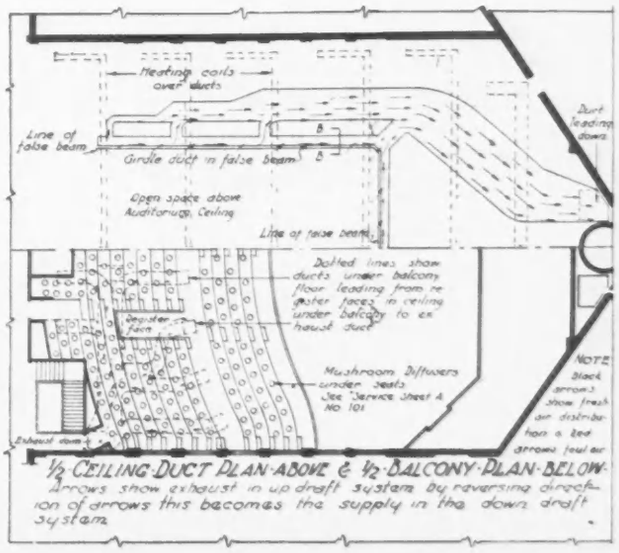
TYPICAL · DUCT · PLAN · FOR · SMALL · AUDITORIUM ·
NO. GEORGE · M · KNIGHT · ENGINEER · NEWARK · NEW JERSEY ·



SECTION AUDITORIUM SCHENLEY HIGH SCHOOL
Arrows show air circulation for the up draft system. Reverse direction of arrows for down draft system



½ AUDITORIUM PLAN ABOVE & ½ BASEMENT DUCT PLAN BELOW
Arrows show air circulation for the up draft system. By reversing damper in basement the whole system is changed to one of down draft. Reverse direction of arrows for down draft

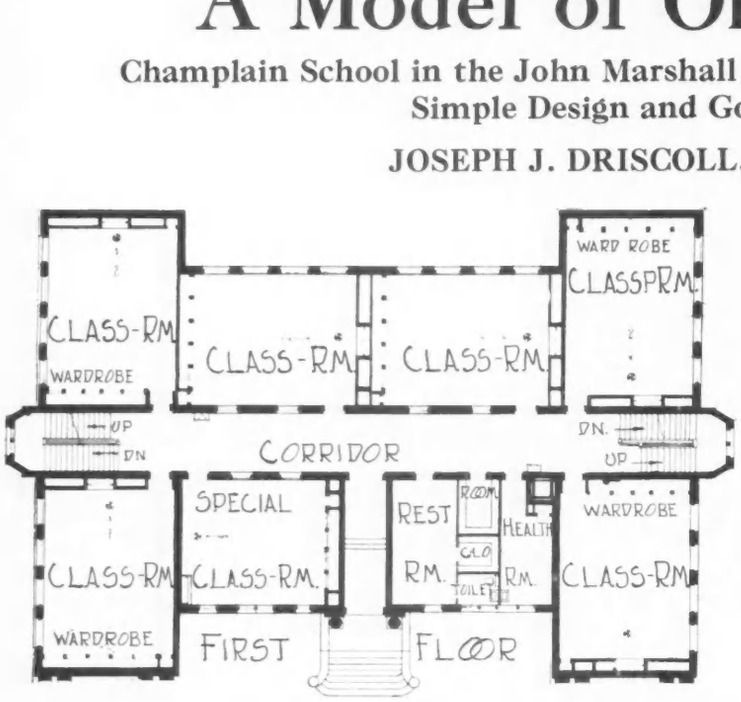


½ CEILING DUCT PLAN ABOVE & ½ BALCONY PLAN BELOW
Arrows show exhaust in up draft system. By reversing direction of arrows this becomes the supply in the down draft system

Boston Elementary School A Model of Orientation

Champlain School in the John Marshall District, Dorchester, Shows Simple Design and Good Lines

JOSEPH J. DRISCOLL, Architect

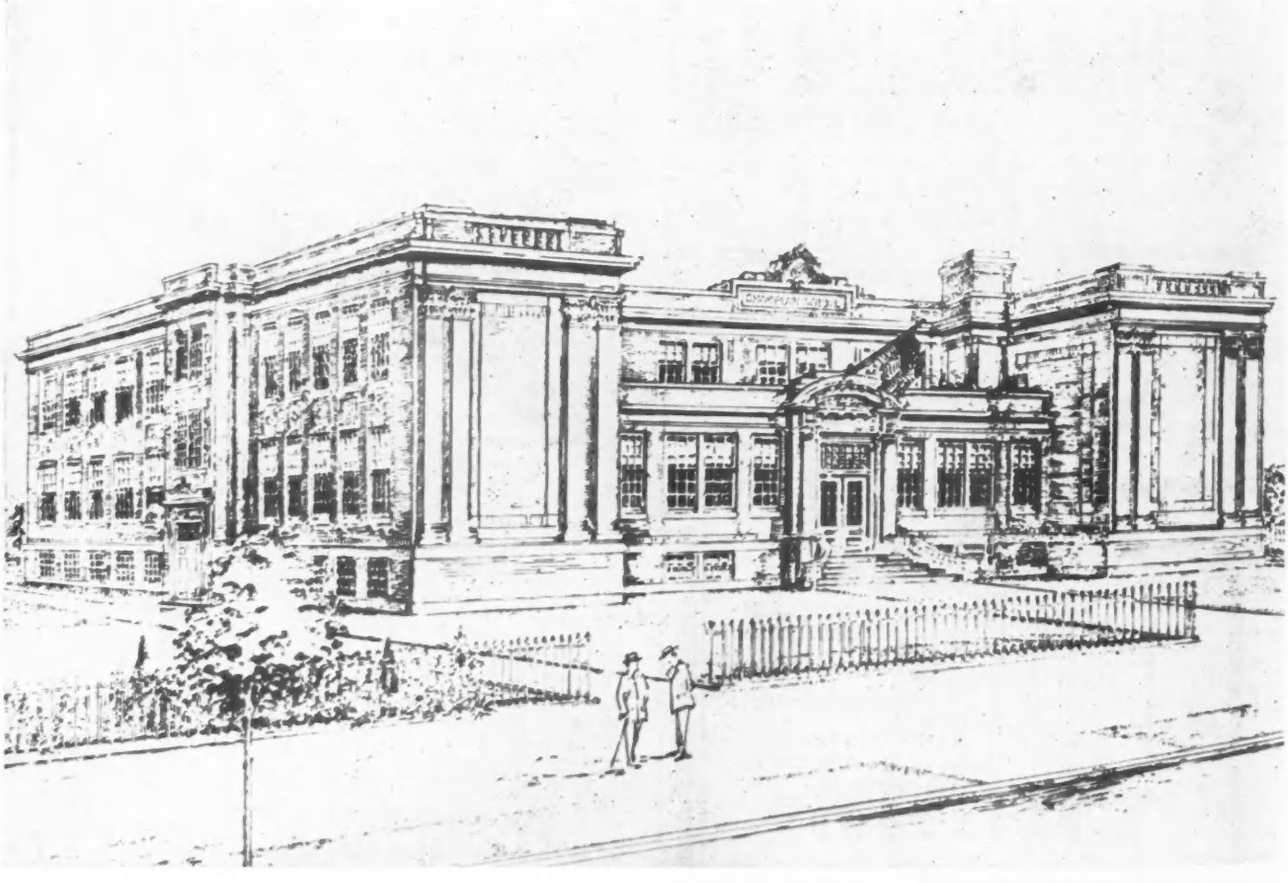


The Champlain School, Boston, Has Seven Large Class Rooms, a Health Room and a Teachers' Rest Room on the First Floor, with a Wardrobe in Each Class Room, as Shown by This First Floor Plan.

TWO new school buildings are approaching completion in the city of Boston, which have points of design well worthy of study. One is the Champlain Elementary School in the John Marshall District, Dorchester, and the other is the James A. Garfield Elementary School in the Brighton District. The first is illustrated herewith and the second, designed by John F. Cullen, architect, will be illustrated in an early issue.

As the perspective shows, the Champlain School, as designed by Architect Joseph J. Driscoll, has exceptionally pleasing lines. The floor plans show a simple, practical arrangement with exceptionally good orientation providing daylight in each classroom from one direction only.

There are seven large classrooms on the first floor and six on the second, with a high basement or ground floor containing two playrooms and two toilets, one each for boys and girls. The basement also contains boiler room, janitor's room and fan room.



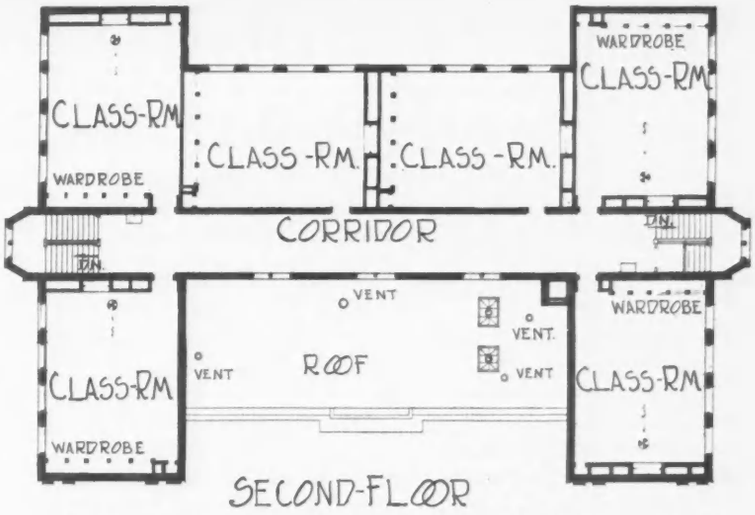
The Architect's Perspective Drawing of the Champlain Elementary School Shows Simple, Pleasing Lines of Architecture and Carefully Studied Orientation Providing a Bright, Cheerful Interior. The light in each class room is arranged to come from one direction only.

Each classroom in the building is equipped with separate wardrobe and there is a health room and a teachers' rest room on the first floor.

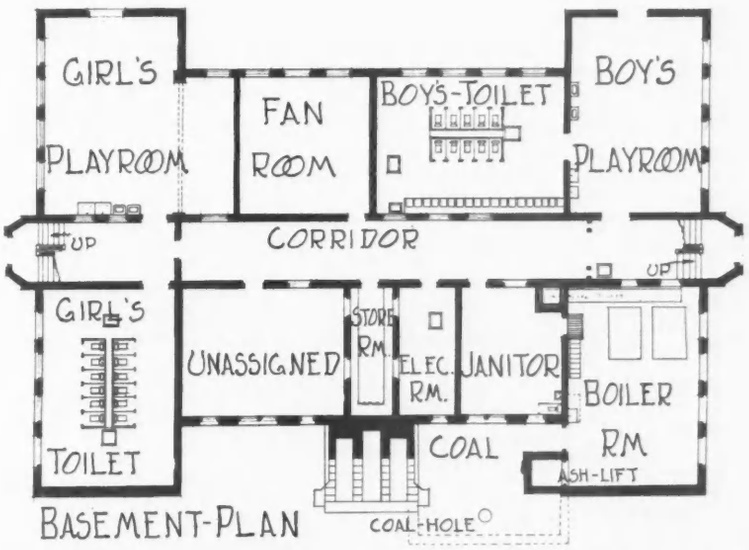
The walls of the building are of brick, with limestone trimmings, and the construction is second class, with fireproof floor over fan, custodian's room, boiler and coal rooms and corridor.

The heating and ventilating equipment of this school are exceptionally good. Two low pressure, sectional steam boilers supply steam for the direct radiation and also for tempering the fresh air supplied through the ventilating system. The heating radiators in each classroom are of the wall type, placed under the windows, and controlled automatically by positive thermostats. The entire system is so designed as to allow the inside temperature to be maintained at any degree desired above the outside temperature. The plant is so designed that it may be operated entirely on gravity.

The plenum fan system of ventilation in this school is designed to supply 1,350 cubic feet of fresh, warm air per minute to each classroom—



The Second Floor Plan of the Champlain School Shows Six Class Rooms of Uniform Size and a Corridor Which Is Daylighted Throughout Its Length. The inside walls of the front wings are purposely left blank so that the class rooms may receive light from one direction only.



The High Basement of the Champlain School Is Really a Ground Floor and Has Plenty of Light and Ventilation. The floor plan shows two large playrooms and two toilet rooms on this floor as well as boiler and fan room, janitor and electrician's rooms.

a supply equal to 30 cubic feet of fresh air per person per minute. Each room is connected with a foul air duct carried to the roof and connected with the main ventilator at the top of the building. The temperature of the fresh air supplied is automatically maintained by mixing dampers in the basement operated by a graduated thermostat.

The building is equipped with telephone in boiler room and first and second floor classrooms; a system of electric secondary clocks controlled by a master clock; a system of program bells controlled by manually operated buttons; a combined local and auxiliary fire alarm system and a system of vacuum cleaning pipe.

✣

Turning Overhead Into Profits

(*Continued from page 366.*)

Just suppose that you are employing four men, each working 45 hours per week. You would have a total of 180 man hours per week. Now suppose when you reduced your estimated monthly overhead to a weekly amount, this amount was $135.00. By dividing the amount of your weekly overhead by the number of man hours per week, you would find 75c to be the overhead expense per man, per hour. Therefore, your cost of carrying on your business would be 75c for each hour of each man's time. A weekly check on this rate should be kept by determining an actual overhead rate from the actual overhead expense and the actual number of man hours per week. Any considerable variation for the period of a month should be corrected by changing your overhead rate per man per hour to conform to the actual figures as shown by the records.

When estimating and making a quotation, you should use a form such as No. 712, on which you list the estimated amount and cost of material required, the number hours of labor required to perform the various kinds of work and the rate paid for that labor. Any special expenses, such as work that cannot be done with your equipment, permits or inspection fees are added. The total of these three items, material, labor and special expenses, will give you the actual cost of completing the job.

Now it is a very simple matter to apportion to this job its proper share of the overhead expense by multiplying the overhead rate per man per hour by the estimated number of hours of labor required for the job. This gives you the total cost, and it is only necessary to add the desired profit. This added profit, you must remember, is net profit, as all else has been taken care of. With the profit added you have your quotation.

On larger contracts, or those requiring a variety of material and labor operations too numerous to be listed here, this sheet can be used for a recapitulation. List the material and labor in detail on other sheets and transfer the totals only to this sheet.

On the contract sheet you list the actual amount of material used, labor required, special expenses and the overhead expense determined from the actual number of hours of labor. In the summary of costs, a comparison of the estimate and the actual costs will show any mistakes in estimating and such mistakes can be prevented in the future.

A contractor should have little difficulty in putting this method in operation immediately. With the use of the forms shown, and such additional ones as are necessary in keeping account of the expense so that it can be checked against the estimated amount, the contractor should be able to adopt this method without the employment of additional help.

More School Usefulness for the Taxpayer's Dollar

By JOHN K. BLITZ

FOR 100 days of the 365, school buildings and equipment costing the taxpayer millions of dollars serve the purpose for which they were built. For 265 days they are simply objects to which we point with pride for the benefit of visiting Rotary Clubs. Realization of this condition is responsible for a new idea in building schools that has to do directly with the taxpayer's dollar—making as much use of costly school establishments as possible during the 100 days of the annual school session. The new construction is based on the relation of school design to attendance.

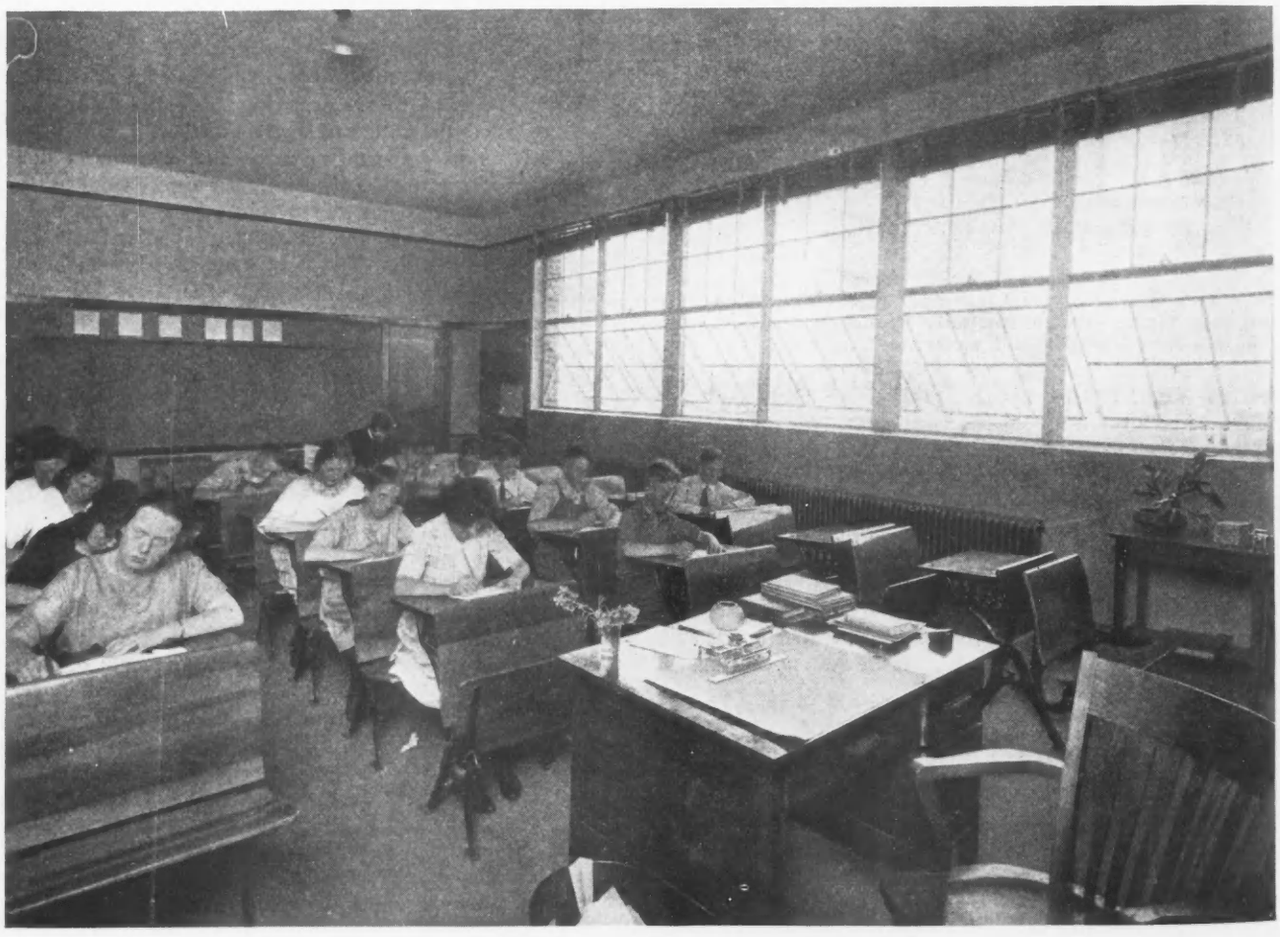
Much absence from school is due to illness. Investigation—notably that made by the New York State Ventilating Commission—has shown that a high percentage of illness is due to faulty ventilation. In seeking to cut the absence total, therefore, school boards and architects have as the prime objective, correct ventilation.

Irrespective of the type of ventilation employed—whether primarily governed by fans or windows—the windows play a stellar role in keeping the schoolroom comfortable and healthful. Abundant natural illumination is controlled by the same factor. It is not surprising, therefore, to find that fenestration of schools, based on ventilating and lighting requirements, has become a science in itself. This development has, in turn, brought about a change in the physical characteristics of the windows themselves.

The steel window industry has risen to the occasion by producing the "reversible ventilator" window with framing sections and muntins made from solid rolled steel. From the lighting standpoint, it is claimed for this type of window that since the bars are smaller than those used in wood windows, more light is admitted than through a wood window of identical overall dimensions. For ventilating, the steel window offers the dual advantage of thorough, easy control and tight closing regardless of weather conditions.

About two-thirds of the glass area is taken up by movable panes, or ventilators, fastened to the fixed portion of the window by pivoting on sliding shoes so as to open outward. A small ventilator is pivoted along its lower edge near the sill to open in and direct fresh air upward and over the heads of the children. Larger ventilators, above this, pivoted along their upper edges, open out, to facilitate the exit of dead air. The sliding shoes to which the ventilators are pivoted remain in the plane of the window and make the ventilators slide in such a way as to reverse themselves. This permits easy cleaning and removes the old bugbear of dirty, light-resisting glass.

Window ventilation requires the frequent opening and closing of windows by the teacher, according to the wind



One Hundred Per Cent Ventilation Is Made Available to Pupils in the McKinley School, Stockton, California, by Reversible, Ventilating Steel Sash. Hugh Y. Davis, architect; Shepherd and Riley, builders.

pressure, whenever the system depends on the lighter heated air being pushed out an exhaust duct near the ceiling by air entering through the windows. Circulation is augmented by wind pressure toward the windows and retarded by the wind blowing the other way. The steel window, with its easy sliding ventilators, can be handled by even the slightest school teacher to produce the desired results. It is not susceptible to weather changes and, therefore, is free from the sticking so frequently found in wood windows. Making it easy for the teacher to vary the window openings is, therefore, one of the prime contributions of steel windows to school ventilation.

Again, from the general description of steel windows that has been given, it will be seen that they embody as an integral feature the deflector, the need for which was stressed by the New York Ventilation Commission.

Where the fan system prevails, it is highly important that the circulation of air be not disturbed by the intrusion of air from the outside. Just as easy-opening windows are indicated in window-ventilation, tight-closing ones are necessitated by the use of fans.

This requirement, too, is met by the steel window. On every one of its four sides, each ventilator meets a steel muntin bar equipped with a spring-steel flange producing two contacts between the ventilator and the stationary portion. The construction is that of two angles meeting along their outer edges to form a hollow square. In this manner, a dead air space, a trifle over a square inch in cross-section, is made to surround the ventilator, forming nearly perfect insulation.

The steel window has a frame so designed that it can be built into the stone, brick or other material forming the walls, rendering impossible the ingress of air through illegitimate cracks and crannies.

The cost of "reversible ventilator" steel windows is as low as that of wood windows, it is stated. This is important in view of the fact that the New York State Ventilation Commission reported that window ventilation seems to be less expensive than plenum fan ventilation.

"It seems reasonably certain," the commission reported, "that the cost of extra radiation and window boards in the window-ventilated room would be more than balanced by the ducts and fans required in the plenum method, and from the standpoint of operation, the lesser aeration in the window-ventilated room must certainly imply a substantial diminution in coal consumption."

In their efforts to reduce absence by eliminating the sickness due to inefficient ventilation, designers of schools are learning to pay fully as much attention to the type of window employed as to the ventilation system itself. Whichever system of aeration is selected, the health of children in school depends on the proper operation of the system.

It is the ever-widening recognition of these facts that has pointed the way to increased school usefulness—giving the taxpayer more for the money he invests in school bonds by keeping the school plant more steadily at work.



Library of Baylor University, Waco, Texas, Which Has Exceptionally Good Daylight and Ventilation by Means of Its Reversible Steel Sash. Birch D. Easterwood, architect; J. E. Johnston Construction Company, builders.

Concrete Floors for Residences

In Which Some of the Popular Fallacies Regarding Concrete Floors Are Cleared Up and Good Construction Methods Suggested

By A. J. R. CURTIS

"CONCRETE floors in your new residence?" The very thought of it would bring to many women a vision of rheumatism, numb feet, chilblains and broken arches. The greater proportion of non-users probably believe that concrete floors, used throughout a residence, would be cold, damp and tiresome, the direct antithesis of what a good floor should be.

But what of the finest new hotels and apartments, school houses, hospitals and palatial residences? All of them have concrete floors. Hotels are competing with each other to give the traveler what will please him most and serve his purpose best; schools and hospitals require the ultimate in firesafe, quiet and footsure flooring; the palatial home also requires these qualities and in addition a substantial structural floor upon which may be placed a variety of floor coverings selected for their utilitarian or decorative adaptabilities.

While the permanence, fireproofness and rigidity of concrete floors are desirable qualities not open to question, the uncertainties concerning their use have centered around the possibilities of coldness, dampness, rough or displeasing surfaces, dusting and cracking. Therefore, what is stated about construction features, later in this article, will be largely with a view to offering methods by which these difficulties are avoided.

Those familiar with concrete residence floors have found many advantages probably not suspected by the average non-user. For example, the greater rigidity given to the structure eliminates vibration caused by heavy city traffic or children jumping on floors above. It also provides greater wall stability, a feature of importance in areas subject to earthquake shocks.

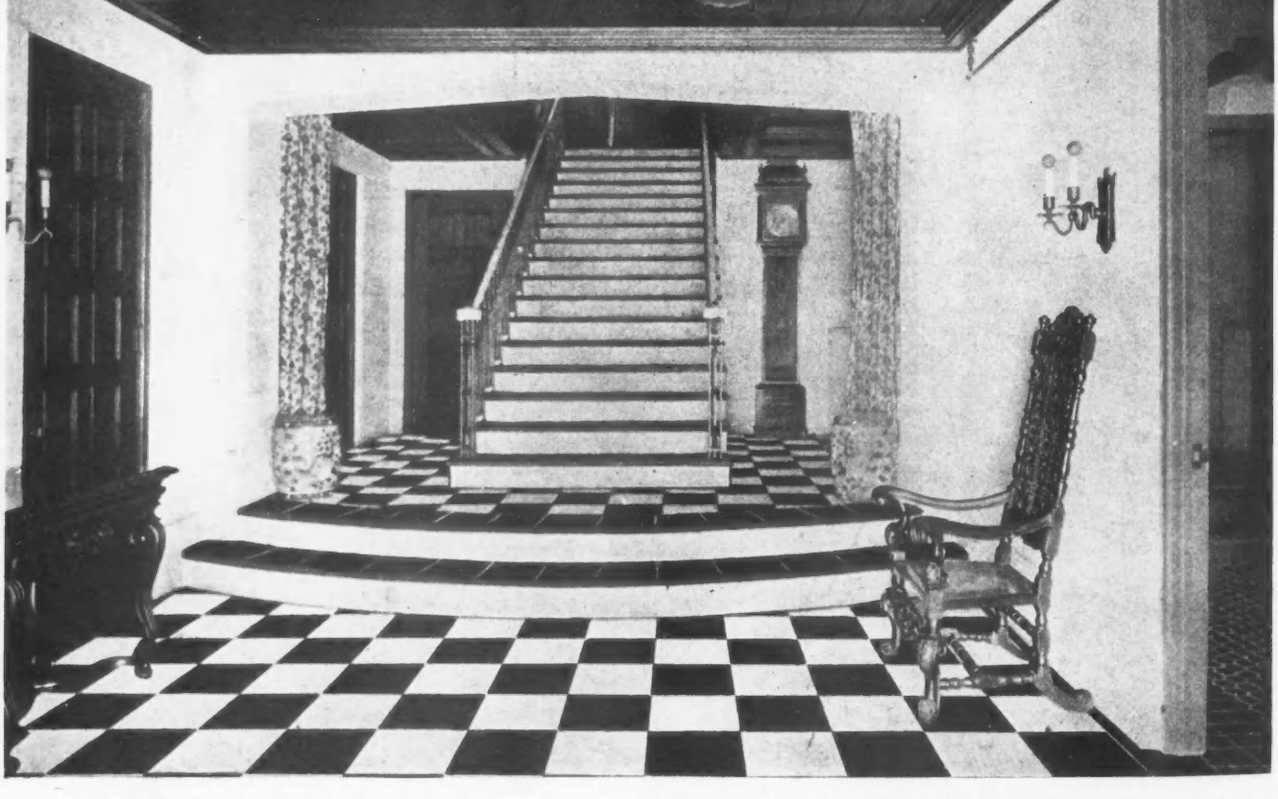
A large proportion of plaster cracks on both partitions and ceilings of dwellings is due to sagging or other movement of ordinary floors, exerting stresses in the backing which are transmitted to the plaster. Concrete floors do not deflect appreciably after the plaster is put on and therefore provide ideal support for both interior partitions and ceilings. Concrete floors seal out smoke and dust from the furnace room, odors from the kitchen, steam from the laundry and—I was going to say—noise from the nursery.

Concrete floors depend for their efficiency as sound deadeners largely on the fact that the smooth surfaces tend to reflect sound rather than pass it through the concrete, while coverings of the nature used on concrete residence floors tend to absorb sound.

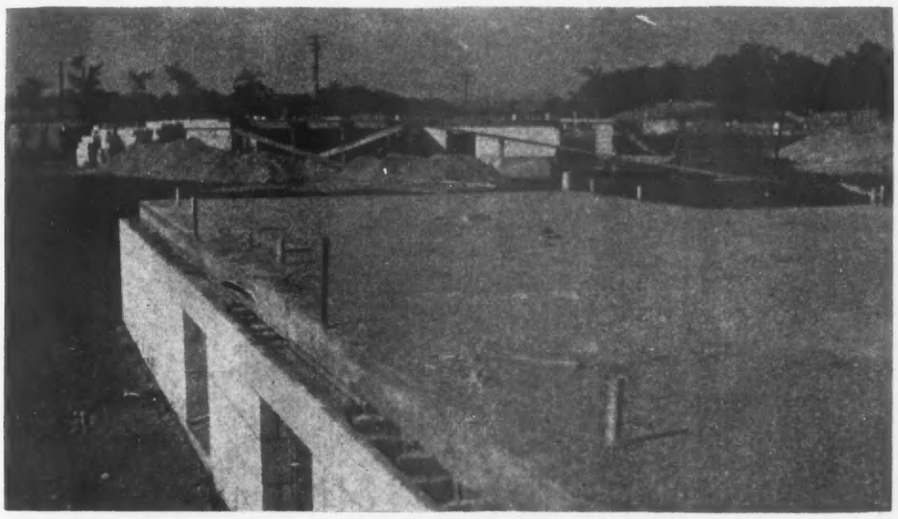
Flat Slab Floors

Concrete floors are equally adaptable to dwellings having walls of solid brick, concrete masonry or monolithic concrete construction and the following description of building methods is applicable to structures of any of these types. Of the various methods evolved, the solid slab system is probably the simplest.

Reinforced concrete slabs of uniform thickness are carried



This Main Hall of a Concrete Floored Residence, Showing the Use of Black and White Italian Tile Flooring, Is an Excellent Evidence of the Fact That Concrete Floors May Be Made Beautiful as Well as Durable.

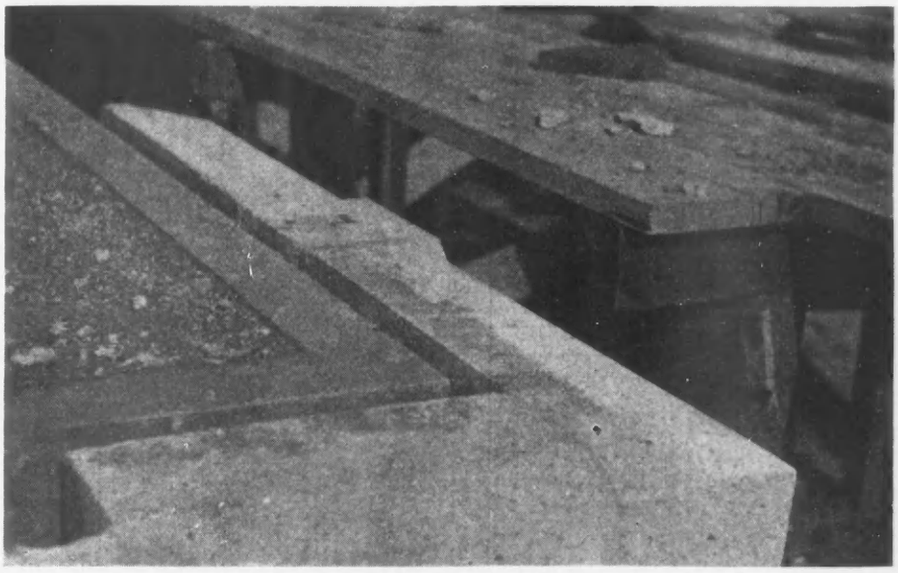


Concrete Floor Resting on a Concrete Masonry Wall. The flooring is covered with sand to insure proper curing.

"temperature" reinforcing in all cases consists of ¼-inch round, or deformed bars, space 12 inches center to center, approximately 1¼ inches below the upper surface.

Ample bearing area on the walls is very important. Where the floor is to be carried on a 12-inch concrete block wall, as commonly used for basements, the slab should rest on the inner five inches of the wall, leaving room for a one-inch air space and four-inch veneer block or a single thickness of brick on the outer four inches of the wall. If resting on eight-inch concrete block or brick wall the slab is given the minimum bearing of four inches.

The floor slab never should be extended over the entire top of the wall, but always so laid that veneer block or brick may be used on the outside. To build floors at the desired levels without the use of fractional courses or "fillers" in the walls, the slabs are built up at the edges as required.

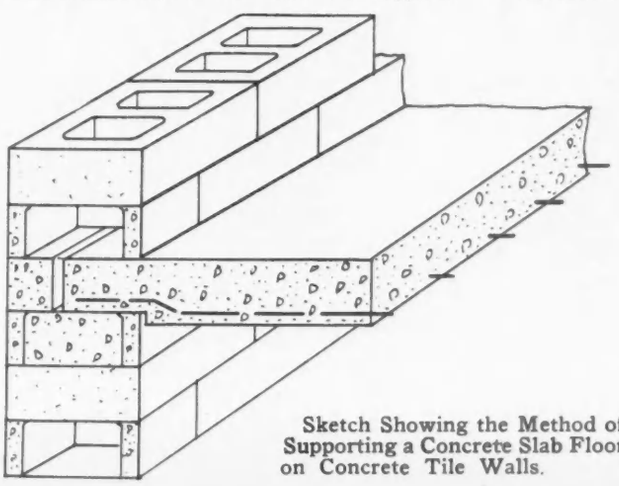


A Concrete Floor Built Up to Give It a Thickness Equal to That of the Water Table Course on the Outside. Notice the air space between the concrete floor and the masonry wall.

across the room spans, and regardless of minor differences in slab thickness possible by reason of variation in span, the maximum thickness required for any span is usually carried throughout the entire width and length of the house. This obviates complications which might result if varying floor thicknesses were used in adjacent rooms. Of course this practice is subject to such variation as may be necessary to accommodate various surfacing methods employed in finishing up the floor in different rooms.

An accompanying table gives the necessary thickness of slab for spans or widths up to 16 feet, any length. Greater distances between supports is unusual in residence construction and requires a special design.

The diameter and spacing of round reinforcing bars for floor slabs is also shown in the table. For simplicity of construction the main reinforcing bars are made to extend only one way across each slab; that is, in the direction of the shorter span. Alternate bars are bent up near supporting points as shown in an accompanying sketch. All reinforcing bars must be fully as long as shown, in order to extend well over the supports. The cross or



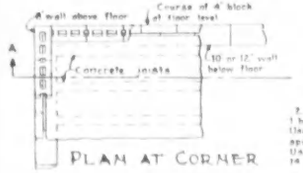
Sketch Showing the Method of Supporting a Concrete Slab Floor on Concrete Tile Walls.

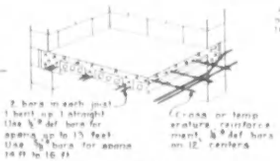
The erection of forms for concrete slab floors is a simple matter. The forms usually consist of a false floor set on four by four-inch crosspieces which in turn are held up by four by four-inch posts placed three feet apart in both directions. Hardwood wedges are driven underneath these posts as required to level the floor forms. At moderate temperatures, the forms should remain in place for one to two weeks after the concrete is placed.

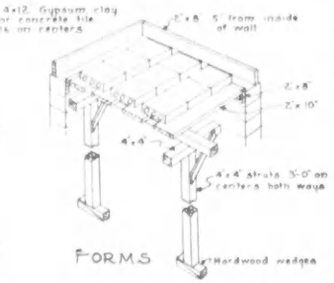
Beam and Slab Floors

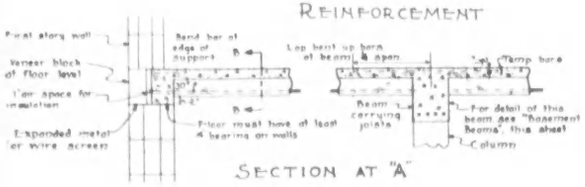
Beam and slab floors are generally considered slightly more economical of material but correspondingly more complicated to build. Consequently, where the floors for only a single house or a small number of houses are to be constructed the flat method (previously described) is used, while for more extensive operations the saving of material often gives preference to the beam and slab method. Two of the simpler types of beam and slab floors, specially adapted to the use of the smaller contracting organizations, will be described. The first of these two is commonly known is "beam and arch" or "steel pan" construction.

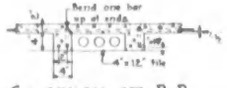
TILE AND JOIST CONCRETE FLOORS





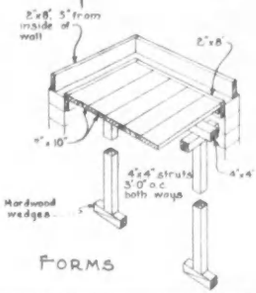




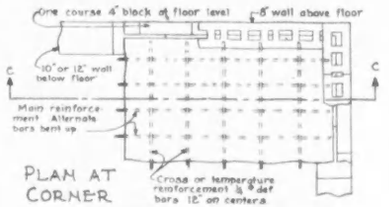


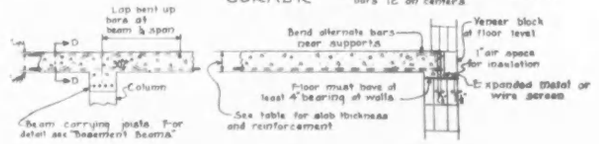
NOTE
This floor for clear spans only, not carrying load bearing partitions or supports for other floors. Maximum span 16 feet

SOLID SLAB CONCRETE FLOORS



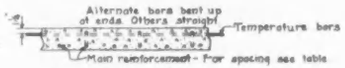
SOLID SLAB FLOORS			
Span feet	Thickness of slab inches	Dia. of round reinforcing bars	Spacing of bars inches
10	4	½	9
11	4½	½	8
12	5	½	7½
13	5½	½	7
14	5½	½	6
15	6	½	7½
16	6	⅝	6





CROSS SECTION OF FLOOR SLAB AT C-C

NOTE
This floor for clear spans only, not carrying load bearing partitions or supports for other floors. Maximum span 16 feet



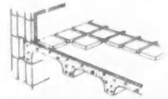
SECTION D-D

SURFACES FOR CONCRETE FLOORS



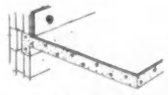
⅝" Narrow wood flooring nailed to 1"x3" sleepers on 16" centers. Sleepers are nailed to concrete soon after it has been placed

WOOD SURFACE



Concrete tile, any color, laide in ½" bed of cement mortar. Joints filled after mortar in bed has set

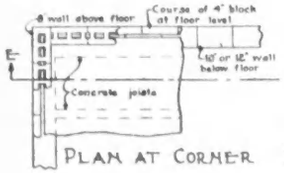
TILE SURFACE

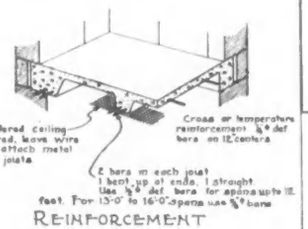


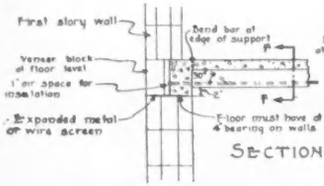
Smooth surface may be smooth troweled finish, Natural or grout. Colored with mineral pigments. Enameled. Stained with brown creosote stain and waxed. Terrazzo. Linoleum.

SMOOTH SURFACE

ARCH AND JOIST CONCRETE FLOORS

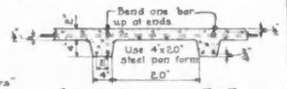


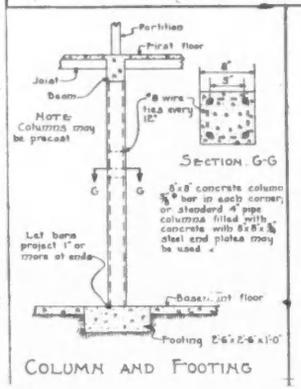




Note
This floor for clear spans only, not carrying load bearing partitions or supports for other floors. Maximum span 16 feet

FORMS
Use type of forms shown above for "Tile and Joist floors"



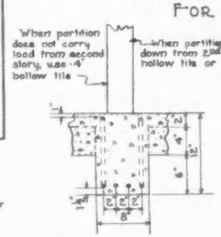


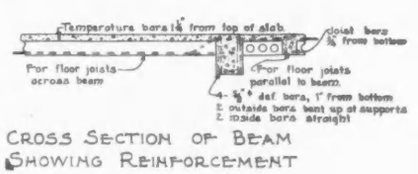
NOTE

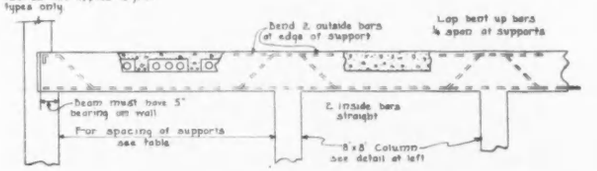
Use beams where floor joists are not carried by basement partitions. Also under any first floor partition which carries load down from second floor and is not supported by basement partition. Beams must be placed in one continuous operation.

SPACING OF SUPPORTS FOR BEAMS		
When ends span of floor carried by beam is	Two Story houses space supports not more than	One Story houses space supports not more than
10' or less	7'-0"	10'-0"
11'	6'-9"	9'-9"
12'	6'-6"	9'-6"
13'	6'-3"	9'-3"
14'	6'-0"	9'-0"
15'	5'-9"	8'-9"
16'	5'-6"	8'-6"

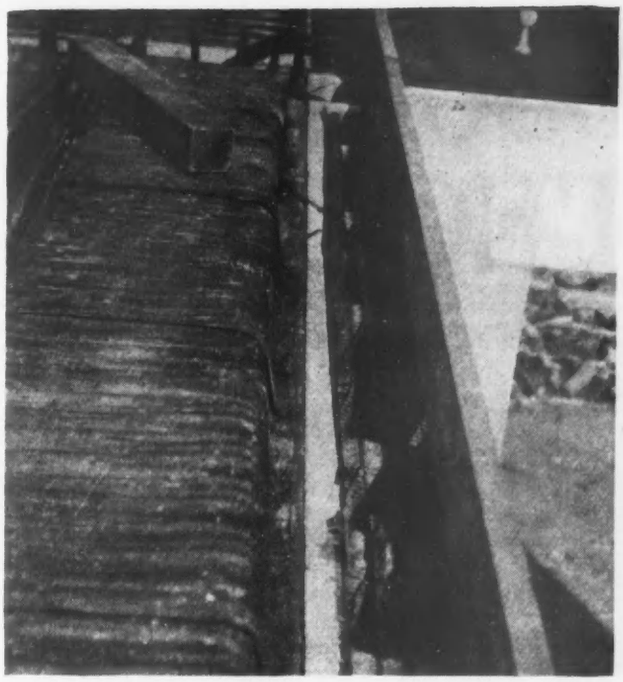
BASEMENT BEAMS FOR RESIDENCE FLOORS



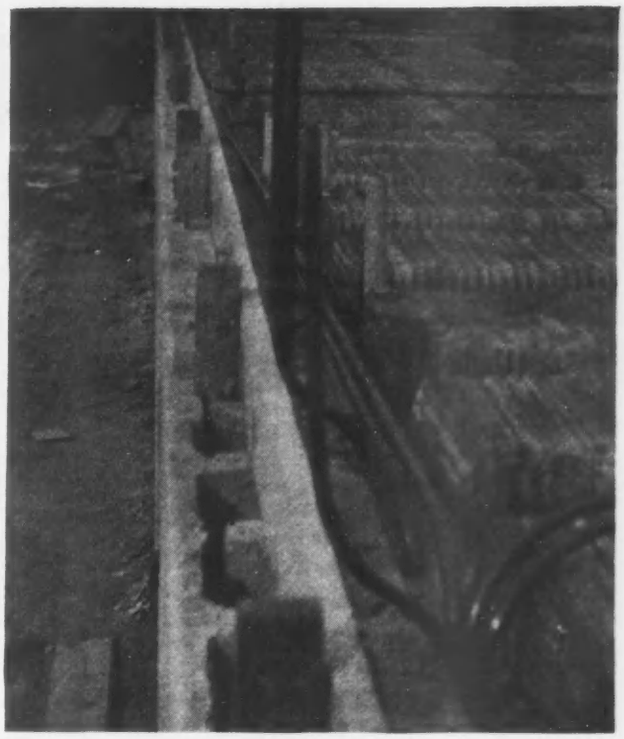




The Drawings Shown on This Page Are Largely Explained in the Captions Which Accompany Them and When Used in Connection with the Descriptive Matter in the Article Afford a Very Clear Idea of the Tile and Joist Floor, the Solid Slab Floor, the Arch and Joist Floor, Basement Beams and Surfaces for Concrete Floors.



Forms in Position for Casting a Tin-Pan Type Floor. Note the beam reinforcing and the metal lath used over the air spaces in walls to prevent the concrete from entering the latter.



End Board and Floor Forms in Position for Casting the Beam and Arch Floor.

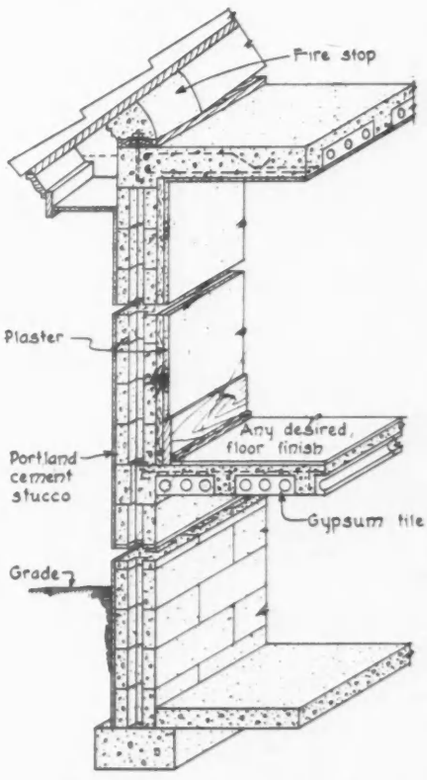
In constructing these floors inverted corrugated metal pans are used for forms. These are set with their edges upon planks laid flat and supported by posts below. Sufficient space is left between pans to form beams of requisite width. The beam reinforcement is laid in these spaces and as far as possible pipes and conduits are made to follow them. With good care these forms may be used over and over again. Careful handling and setting is necessary to avoid distortion of beam and slab dimensions and preserve the forms for repeated use.

Another type of beam and slab floor is constructed by what is frequently referred to as the "beam and tile" method. It is simpler in that cinder concrete or gypsum partition blocks take the place of the "tin pan" forms mentioned in connection with the previous method, the former remaining in place between the beams permanently, producing a smooth horizontal surface for ceiling plaster beneath.

This method makes possible a shallow beam and moderate total floor thickness, this dimension usually being six inches, several inches less than the thickness of ordinary wooden floors. Reducing the thickness of the floors gives several inches greater ceiling heights with the same wall heights, or makes possible any desired ceiling heights with a saving of several inches in wall height.

The reinforcing material for beam and tile floors is placed in the same manner as where the "tin pan" method is used and the support of these various types on the side walls is identical. The beam and tile method offers additional advantages such as affording easy passage for conduits or pipes which cannot follow the spaces left for the beams. Cinder concrete or gypsum tile may be cut as desired to permit laying conduits or pipes across them.

A convenient method of forming holes through concrete floors of any of these types, for the passage of heating and other vertical pipes, is by the use of galvanized iron sleeves. These tubes or sleeves are made of light material, with joint turned and rolled flat, with length usually three inches greater than the thickness of the concrete slab. The lower inch is slitted and bent down crow-foot fashion, for secure attachment to the forms. The tube is filled with sand to prevent collapse. After the floor has hardened the tube may be pried loose with a screw driver or left in place as desired.



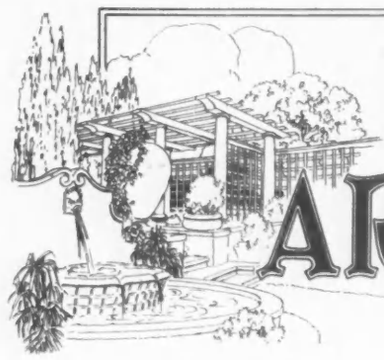
Sectional View Showing Construction and Method of Supporting Concrete Beam and Tile Floor with Masonry Walls.

Surface Treatment

Concrete floors for residences can never reach any great popularity until the variety of simple and beautiful surfacings is understood and appreciated. No one would choose for a fine house a concrete floor that would resemble a sidewalk. The residence floor requires more refined treatment. Happily, there are available finishes that are not only appropriate, but decorative and interesting as well.

For example, in many fine homes which have concrete floors throughout, fine oak flooring has been laid on strips over the concrete in the living room and library; the reception hall floor is covered with floor tile laid after the Italian manner, the dining room with Dutch tile and the sun room with smooth, waxed terrazzo. Baths and lavatories are floored with the usual small ceramic tile.

Kitchen and service halls have linoleum coverings cemented to the concrete.



LANDSCAPE ARCHITECTURE

By F.A.Cushing Smith Landscape Architect

Hardy Plants for Northern Homes

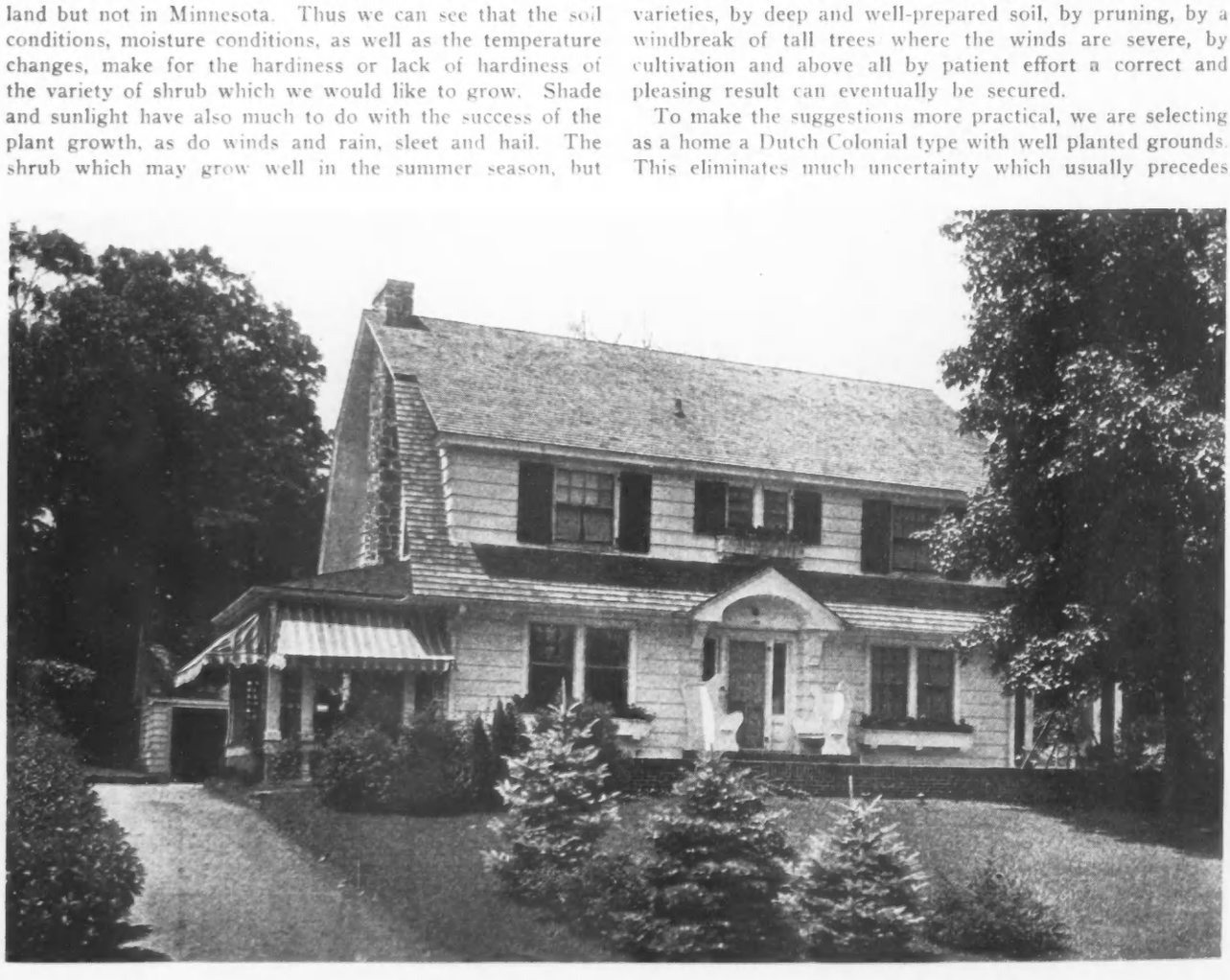
TO the present popular motto, "A house is not a home until it is planted," some of us would like to add, "until it is planted with hardy material." The mere fact that in a catalog the shrubs, trees, and flowers are cleverly displayed in color, or the description and photograph of some unusual plant specimen might appeal to you, does not make that plant or tree a usable variety to buy.

Hardiness is a term which is much misunderstood, and much misused. To the writer the plant is not hardy unless it will thrive under the climatic conditions of the locality in which it is to be planted. The temperatures of New England are just as severe as those of northern Minnesota, yet the rhododendron and the azalea will thrive in New England but not in Minnesota. Thus we can see that the soil conditions, moisture conditions, as well as the temperature changes, make for the hardiness or lack of hardiness of the variety of shrub which we would like to grow. Shade and sunlight have also much to do with the success of the plant growth, as do winds and rain, sleet and hail. The shrub which may grow well in the summer season, but which dies back to the ground each severe winter and thus requires protection, is not a hardy shrub.

The more severe the climatic conditions the more carefully must we plant the shrubs, the more carefully prepare the planting areas, and properly mulch and protect the plants.

The home owner who must by force of circumstances build his home in the northern states, away from the tempering effects of the Great Lakes, need not thereby be deprived of the joys of having attractive home grounds. His family deserve the same pleasures, perhaps in a greater degree, afforded all of us who own our homes, and who delight in the development of the plants making up the setting for this ideal home. By careful selection of varieties, by deep and well-prepared soil, by pruning, by a windbreak of tall trees where the winds are severe, by cultivation and above all by patient effort a correct and pleasing result can eventually be secured.

To make the suggestions more practical, we are selecting as a home a Dutch Colonial type with well planted grounds. This eliminates much uncertainty which usually precedes

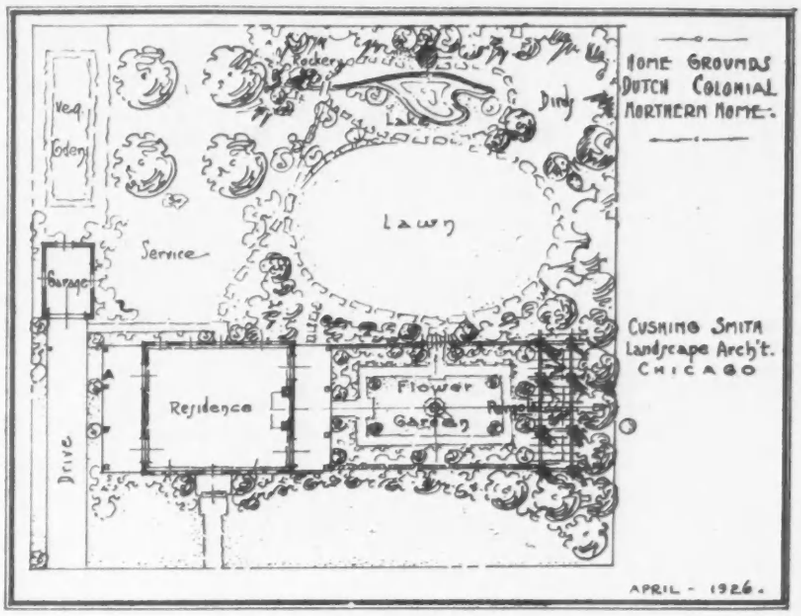


The House Which Is a Home Is Surrounded with Plantings of Trees, Shrubs and Flowers and These Should Be Selected with Reference to Their Hardiness in Relation to the Climate in Which the Home Is Built.

the building of a home. We have prior to developing the plan for the house, decided upon a location, or a lot which seems to be in the right neighborhood, in a close proximity to our business. We are to have a car, also, so that a garage is an essential element in our planning of the grounds.

If we have been trying to decide between a house site on a knoll or hilltop, and one in the valley, do not decide too quickly upon the hilltop location. While in summer the breezes cool the living room, yet in winter the bleak snow storms bring all of their howling force to bear upon the house as it perches upon the peak of the hill. If such an unprotected area is the only one available, then plant a hedge row of evergreens or other tall trees to break the force of the gale, between the house and the direction from which the prevailing winds come.

Usually a building site part way down a hillside rather than either in the valley bottom or on the hilltop will be best. In the bottom lands, the drifts settle, and the damp pockets of early fog and mist hover for many hours in the early morning hours, before the sun breaks through the clouds.



On a corner lot, which is the type which we have chosen for our new home, more variety is possible in the placing and orientation of the house. Thus in this case the long dimension of the house should run the long way of the lot. Every subdivision would naturally have certain restrictions as to the set-back of the house from the street, but its adaptation to the sides and to the size of the lot is a matter for the architect and the owner to decide for themselves. The lines of this Dutch Colonial house seem to call for the arrangement selected with the two porches, one at either end, and the long sweeping lines of the roof, which in turn seem to help in tying the building to the ground.

The plan of the house has been decided upon with a lot fronting toward the north in mind, so that the dining room windows open toward the east. Our living room is thus toward the west, and our garden protected from the north winds and from the inquiring eyes of the passing public by a heavy strip of planting of trees and shrubs just outside of the hedge enclosure. Within the garden a quaint old sundial graces the center turf panel, with the flowers about the borders inside of the hedge, and a pergola with seats of comfort at the end of the garden, all backed by tall pyramidal poplars or fine maples for shade and protection.

The vegetable garden and the small orchard take up much space in the back yard, just to the rear of the garage, which for convenience is located near to the house and to the back door. The service area for a drying yard is again just outside of the laundry back entry.

At the south end of the lot, viewed underneath the rose-covered arch in the garden hedge, we catch a glimpse of the shelter and seats across a small pool or lake. The lake is fed by means of an artificial spring which bubbles up from among the stones of a flower bedecked rockery near the orchard edge. In the quiet pool the fish dart to and fro and the idly floating water lilies give grace and color to the green waters. Tea can be served beneath the big willow which covers over the shelter, and in the pool the children can paddle about to their hearts content.

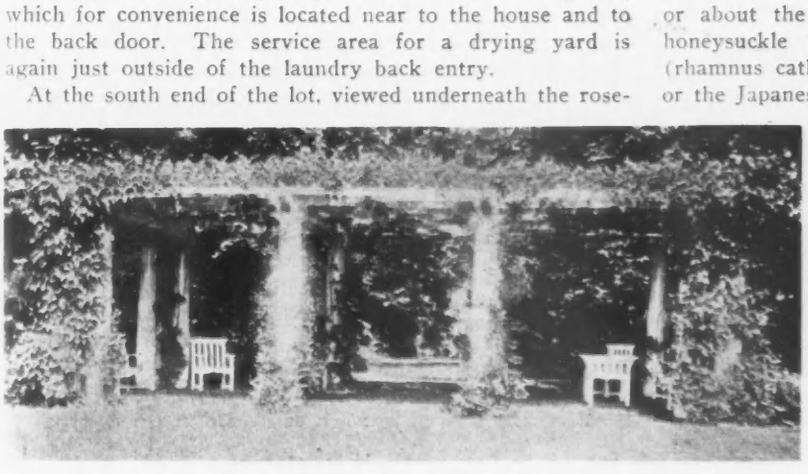
Just off the edge of the lake to the west, is a bird sanctuary, where I would have you plant the shrubs, trees and vines whose fruits would attract the feathered songsters. If you have a fine lot of raspberries in your garden, and would protect them from the ravages of the birds, plant the wild fruited shrubs and trees, and provide bird baths, or a shallow end to your pool, and they will not bother your prized berries.

The tendency of extreme cold upon most plants is to dwarf them, or to stunt their growth, giving at times in the case of trees a grotesque outline of gnarled, twisted and bent branches. The shrubs and trees which we can wisely plant under the severe climatic conditions where we are now building can be few in number. Remember that, in spite of friendly suggestions to the contrary, the shrubs which you can successfully plant will be either those which are native to the section, or those which after years of experimentation on the part of others have proven to be hardy.

For use in the hedges either about the outline of the lot, or about the garden, we may safely use the Tartarian honeysuckle (lonicera tatarica), the common buckthorn (rhamnus cathartica), the Alpine currant (ribes alpinum), or the Japanese rose (rosa rugosa). Where soil conditions are not of the best, especially in a stiff clay soil, the latter will not always survive. Among the trees for hedges might be mentioned the red cedar (juniperus Virginiana), the Norway spruce (picea excelsa), the Black Hills spruce (picea Canadensis), the white pine (pinus strobus), the Austrian pine (pinus nigra Austriaca) with its long dark green stiff needles, and the Scotch pine (pinus sylvestris) with its irregular gnarled and yellowish branches.

The shrubs upon the balance of the place might safely include the sweet fern (comptonia asplenifolia), which although, rather low in habit, is excellent as facing

(*Continued to page 380.*)



A Vine-Covered Pergola at the Far End of the Flower Garden Affords a Semi-Sheltered Retreat for the Warm Summer Days and Adds Much to the Charm of the Garden.



FURNACE HEATING

Suggestions on Heating Register Installation

Major Considerations in Selecting the Best Types and Locations of Warm-Air and Cold-Air Registers and Grilles in Furnace Heating

By ROBERT C. NASON

A FEATURE of warm-air heating often given insufficient attention is the selection and setting of registers. The use of plain black japanned registers in handsomely furnished rooms, when ornate and appropriate faces might have been installed, has placed this method of heating at a disadvantage in many instances. As the leading manufacturers offer a wide variety of styles and finishes little reason exists for the use of plain black registers, except a desire for economy, with regard for appearance only a secondary consideration.

Registers, it should be recalled, are the largest pieces of exposed hardware in the room. If proper discrimination is shown, registers and grilles will be looked upon as adding to the attractiveness of rooms rather than as eyesores to be located behind doors or other out of the way spots where, from the standpoint of efficient heating, they should never be placed.

In designing a warm-air heating system, efficiency should always be a prime consideration. To this end warm-air registers give best results when located in inner partitions away from the chilling effect of outside walls. They may be placed either in baseboards or floors, centrally located and remote from hall doors. Some installers urge the desirability of placing them in inside partitions but near outside walls in the belief that the infiltration of cold air from such walls aids the distribution of warm air by forcing it to traverse the entire room.

This point while well taken with regard to northern rooms does not apply to southern or eastern rooms, for it is known that the general movement of air throughout a building is in most parts of the country from north and northwest. Were registers to be placed near outside walls in rooms with southern exposure the path of the warm air would be contrary to the general air stream. Hence, warm-air faces would best be installed in inner partitions near outside walls in northern and western rooms and in inner partitions away from outside walls in rooms having southern and eastern exposures.

Care would best be exercised not to place warm-air registers near fireplaces or large windows. This is a common error. In fact, a case was brought to the author's attention only recently. The room in question was a dining room and had a bay window on the north side. Although the warm-air register was some 6 feet from the window, the infiltration entering at this point nullified the circulation of warm air and made the room almost impossible to heat.

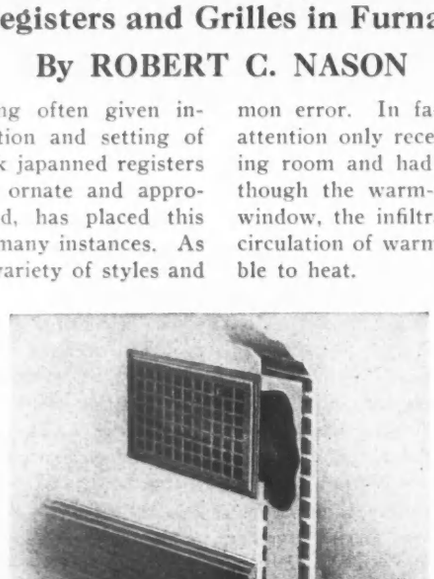


Fig. 1. Sectional View of Warm Air Leader Duct, Baseboard Register and Wafer Type Wall Register.

It was necessary in this case to install a cold-air return grille in the floor directly beneath the window. The cold air from the window then passed down the cold-air grille, permitting the warm air to pursue its natural course. The large exposure encountered in rooms with bay windows or those with a large amount of glass surface in northern rooms makes it desirable to place such cold-air returns near points of greatest infiltration.

Variance of opinion exists as to the relative value of placing registers in the floor or in baseboards. Recent tests conducted at the University of Illinois indicate little difference in heating effect of the two types for first floor rooms but that baseboard registers deliver considerably more heat when installed in second floor rooms. When second and third floors are supplied from the same warm-air leader pipe it is customary to install wall registers just above the baseboard on the third floor.

In certain sections of the country, notably the West and Northwest, baseboard registers are preferred on both first and second floor rooms. With this in view partitions are built deeper to permit deeper warm-air ducts. Partitions in eastern and southern buildings are usually thinner, with the result that ducts more than 3⅝ inches deep or more than 14 inches wide cannot be installed within partitions. Common practice recommends the use of floor registers on first floor, baseboard registers on second floors and wall registers on the third floor. In single-story buildings preference is about equally divided between baseboard and floor types.

Wall Registers

Whereas floor registers are usually of the multiple louvre (fan) type, baseboard and wall faces are equipped with only

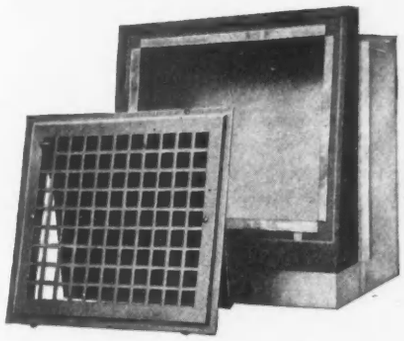


Fig. 3. Edges of the Register Box Should Be Bent Over in the Manner Here Shown to Make Tight Connections.

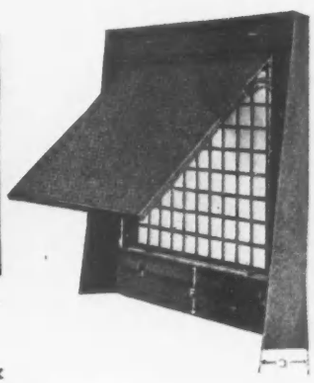


Fig. 4. A Back View of the Baseboard Register.

a single "valve," or regulating damper. These are shown in Fig. 1, which represents a cross sectional view of leader pipe to second and third floors and registers of baseboard and wall designs. Attention is directed to the upper register which, on account of its thin cross section, is known as a "wafer" register. This type offers almost no obstruction to air flow as it does not protrude into the duct. It is undesirable to use the ordinary floor type of register in walls because the fans protrude several inches into the duct and interfere with the flow of heat through it.

Another type much used in wall installations is the convex design shown in Fig. 2. As the face protrudes into the room rather than into the register, little interference to air flow is offered.

When floor registers are used they are usually provided with narrow borders which are set flush with the floor and on which the register rests. An alternative suggestion by the Standard Code of the National Warm Air Heating and Ventilating Association is the use of double register boxes of galvanized iron or heavy tin, having 5/16 inch air space between inner and outer boxes as a precaution against fire.

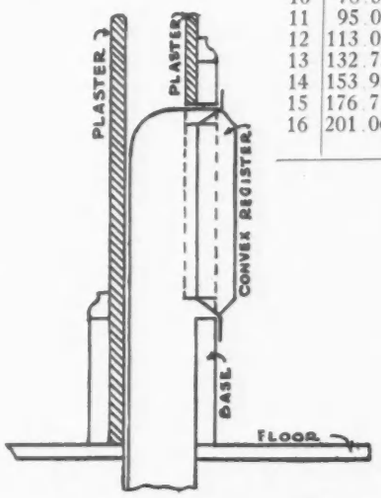


Fig. 2. Side View of Side Wall Register Connection to Illustrate the Convex Style of Face.

Tightness of Joints Important

It is essential that joints between registers and warm-air leader ducts be made tight, to prevent streaking of walls which result from looseness at these points. Galvanized iron boxes, known as stack heads, are connected to the leaders to receive the registers. The edges of the metal boxes would best be bent over the inside edge of the register flange as shown in Fig. 3, whereupon the register face is fastened to the frames with screws and the frame in turn fastened to the studding with long wood screws. Some manufacturers provide slots for the side of the flanges of registers so that the register may be attached to stack heads by this means. Fig. 4 shows the back view of a standard make of baseboard register.

Selection of the size of register to use is influenced by the size of the warm-air leader duct and the heating requirement of the room. In general, north and northwest rooms should have one size larger pipe and register than rooms of the same size but located on the south or southeast. Rooms with bay windows and large glass area, on the north and northwest sides, should have two sizes larger warm air pipes and registers than rooms of the same size located on the south side but without the extra large glass area.

The free area of registers in relation to their gross area depends on the design of face and varies from 50 to 80 per cent free. Unless the free area is known, it is unwise to assume it to be greater than 55 per cent. The accompanying table gives data concerning stock registers of plain, latticed design, as manufactured by the two leading manufacturers and will be of assistance in selecting sizes to be installed.

R'd. Pipe Inches	Cross Section Square Inches	Regular Sizes Register Floor and Plin. Side Wall Inches	Free Air Opening Square Inches	Base Board 1st Floor Only Square Inches	Free Air Opening Square Inches	Base Boards 2nd and 3rd Floors	Free Air Opening Square Inches
8	50.27	8x12	52.90	7x12	53.20	8x10	49.50
9	63.61	10x12	66.47	8x13	64.40	8x12	59.65
10	78.54	12x14	83.03	10x12	75.00	9x12	66.16
11	95.03	12x15	98.04	10x14	87.71		
12	113.09	14x16	111.07	12x14	105.51		
13	132.73	14x18	125.10				
14	153.93	16x20	172.00				
15	176.71	18x20	1093.85				
16	201.06	20x20	215.70				

Manufacturers list their registers by dimensions of the fret-work instead of the overall dimensions, as the inside dimensions are those of the openings which the registers are to cover. This is explained in Fig. 5 in which A represents the effective or proper dimensions and B the outside dimensions. In general, outside dimensions are from 1¾ to 2½ inches greater than the effective dimensions.

Readers are urged not to estimate register sizes too small as building limitations often prevent the extension of adequately sized ducts. Consequently, unless the free areas of registers are at least as great as the areas of the ducts to which they are connected there is likely to be resistance to the flow of heat into the rooms. Some engineers recommend that the free openings of registers be from 10 to 25 per cent greater than that of the ducts which they join.

It is not unlikely that at some future time it will be customary to use deeper studding so that leader pipes may be 5 to 6 inches deep instead of 3⅝ inches, which is scant in altogether too many instances.

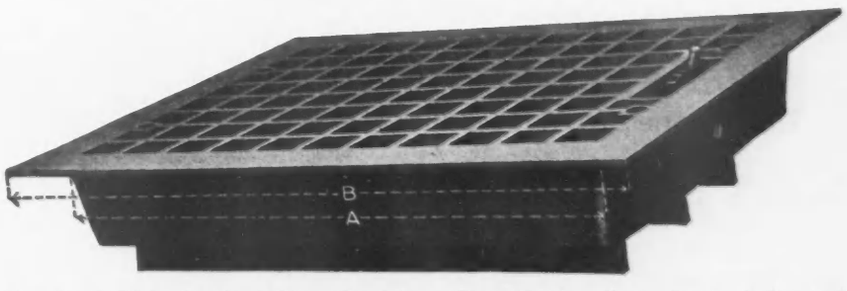


Fig. 5. A Plain Latticed Floor Register. The effective dimension is designated as "A."

Register Installation

Cold-Air Return Registers

One of the outstanding features of a warm-air heating system is the fact that this method should provide the maximum amount of fresh air possible with any system of heating. With this in mind it is desirable that cold-air return grilles be so located that only pure air enters.

An illustration bearing on this subject occurred some years ago in a large, stone residence which had been converted into a boarding house enjoying only a high class patronage. Although little heat is needed ordinarily in kitchens, the kitchen in this particular house was of large size and had a summer porch on the northern side. The doorway between kitchen and porch had been cut away and in summer the cook slept there.

As an unusually large amount of window area had been installed in the porch, infiltration from this side in winter was so large that heating was poor and an installer was called in to look the ground over. There appeared to the artisan only the plan of installing a large cold-air return in the floor of the porch to take the cold air to the furnace for heating, thereby permitting added delivery of the warm air from the floor register near the inner partition. This was done and the heating result proved exceptionally good, but the odor of cooking permeated the remainder of the house whenever the range was in operation. It was at first thought that the smells entered the house through the swinging doors between the kitchen and the dining room.

The author was then called in and offered the opinion that the odors went down the cold-air register to the bottom of the casing where they were warmed and delivered to the house through the distributing piping system. Shutting off the cold-air return proved the truth of this. The return was permanently closed, a larger leader to the kitchen was installed and double sashes placed on the windows, which had the desired result and complaint ceased.

This case only emphasizes the fact that it is inadvisable to locate return registers in kitchens, bathrooms, sleeping rooms or other rooms where the air is likely to be impure. They would preferably be located in halls, living or dining rooms. In general, cold-air and warm-air faces should not be close together, nor should cold-air faces be placed directly over furnaces.

There is little or no advantage in introducing warm air to rooms from wall registers often seen placed about seven feet above the floor, as is done in school house heating. To obtain good circulation under such conditions demands cold-air returns in each room near the floor line as is done in school house heating when the hot-blast method is used.

Warm-air wall registers should in most cases be restricted to top floors where they connect to the ends of leader pipes. This type of register would best be of steel, because of the light weight of this material as compared with the combined cast-iron and steel type (having a cast-iron face and steel frame). When floor registers of cast-iron and steel are installed in walls additional support is required, otherwise sagging of the walls will result.

✣

Landscape Architecture

(*Continued from page 377.*)

material in front of the taller varieties. The flowering currant (ribes aureum) may usually be included, as can the wild gooseberry (ribes oxycantha) and the flowering raspberry (rubus odoratus). Of the spirea family, always a standby, but two of the varieties are suitable under our present conditions of cold, namely, the sorb-leaved spirea, and the hardhack (spirea tomentosa), and the Indian currant (symphoricarpus vulgaris) will also thrive here.

Vines upon the fences and upon the pergola, or over the sun-dial in our garden will be practically all native material, the bitter-sweet (celastrus scandens), the matrimony vine (lycium halimifolium), and the Virginia creeper (ampelopsis quinquifolia).

About the bird-garden, beside the lake, I would like to see an old willow tree shading the playhouse, with its pendulous branches swaying in the wind. The shrubs which would mean much to the life of our songsters would be the chokeberry (aronia), the barberries in variety, the dogwood, the elderberries brought from the fence row, and among the trees, the mulberry, and all varieties of the cherry and of the plum.

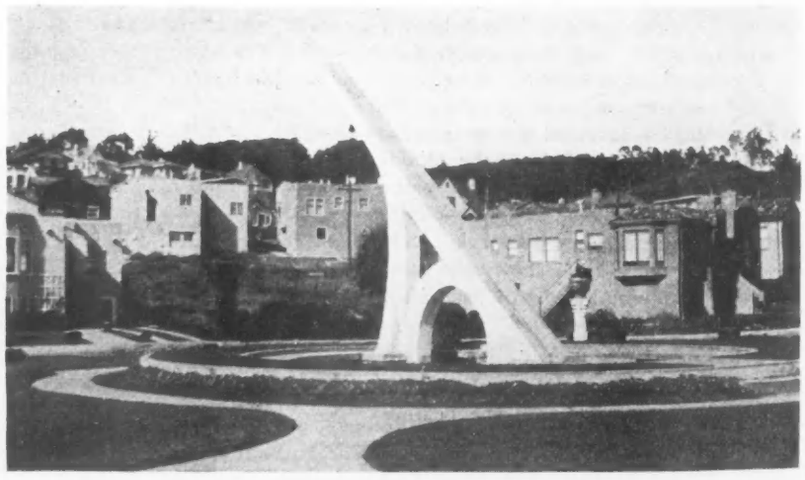
Without the perennials in the flower garden, it would probably not seem like home to many of us. It is true, however, that we may need to fill in the bare spaces with annuals, grown under glass during the early spring, to insure bloom during the entire season. Late frosts in the spring may nip some of these plants, and the early frosts of fall may make the blooming season comparatively short.

For the northern states in general the spring planting season is the best. Winters are so long, and the fall season so short, that if a summer has been dry, the plants will be winter-killed, if set out in the fall. Deep cultivation, plenty of water, with plenty of good fertilizer unsparingly applied and deeply spaded into the soil can do wonders for even a somewhat tender plant. When the plants show signs of tenderness, wrap them in the fall with burlap and straw mats. Only thus can they survive the winter and assure us of a large measure of success.

✣

Sun Time at Ingleside Terrace

IN the laying out of new subdivisions, it has been found that some distinctive features are always desirable. These serve to put the new section in a class by itself. Leonard & Holt, of San Francisco, have had this in mind in planning a gigantic sun dial for their new residential subdivision, Ingleside Terrace. This stands in the center of a special plot that has been set aside for it, and is surrounded by walks in such a way that it is very convenient for observers to note just where the shadow of the towering pointer falls, thus determining with considerable accuracy the time of day. As the dial is painted a dazzling white, it adds a striking feature to the landscape.



A Striking and Truly Attractive Feature of a San Francisco Suburb Takes the Form of a Giant Sun Dial.

Gothic Roof Dairy Barn for Twenty Cows

Striking Appearance and Step-Saving Arrangement Feature This Modern Barn Plan

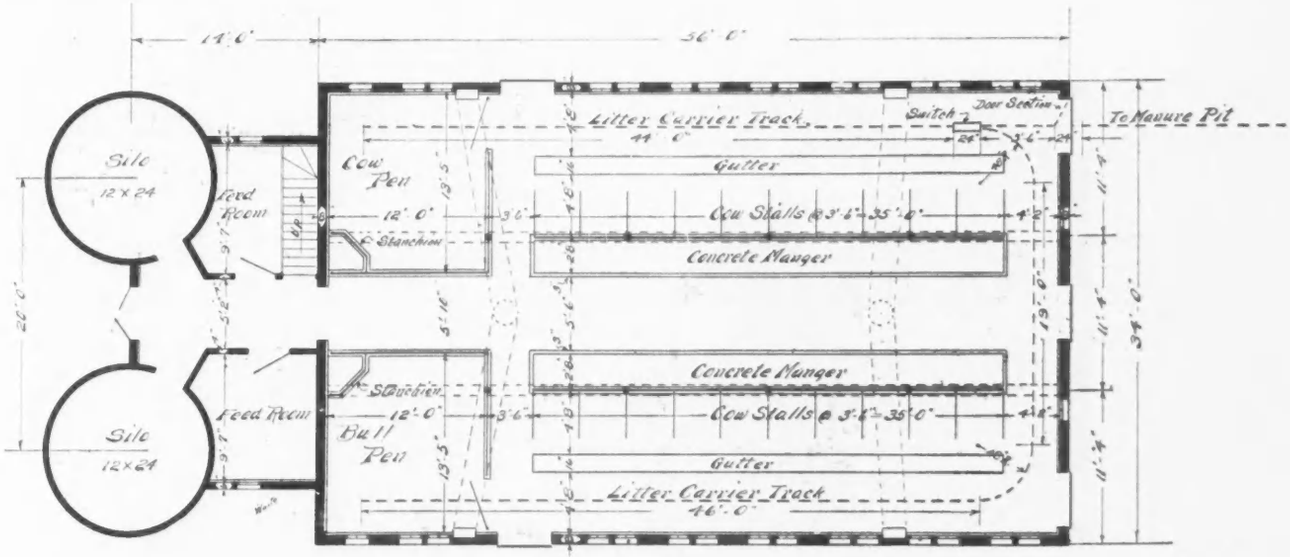
THE Gothic or curved arch roof makes a striking appearance and at the same time a strong, durable construction at very little additional cost. The hay mow is unobstructed by posts or beams and will contain a large amount of storage space.

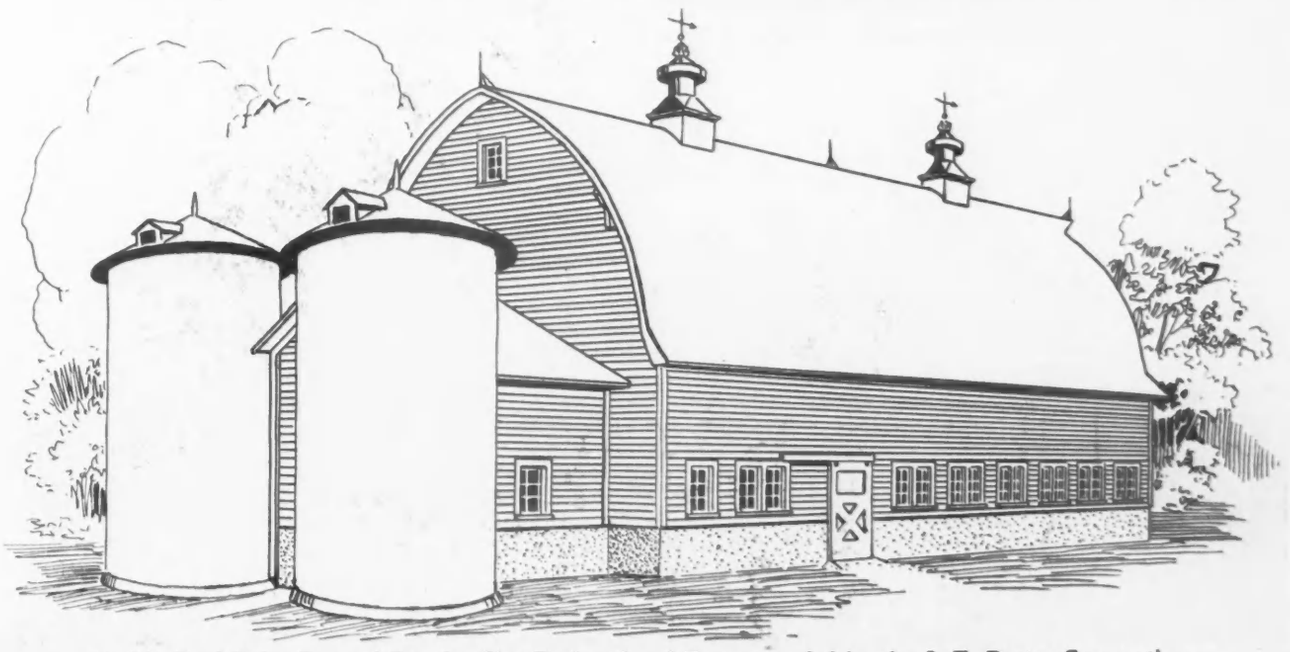
The stable floor of this barn is laid out for twenty cows in stanchions, besides two large pens. Two silos, 12 by 24 feet are at the end of the barn connected to it by a feed room. The central feed alley leads straight through from the silos and feed rooms to the line of mangers. Wheel trucks will handle the feed and overhead carriers circling the stable through the litter alleys will make easy the work of cleaning this stable.

The dimensions of this barn are 34 by 56 feet, a very practical, popular size.

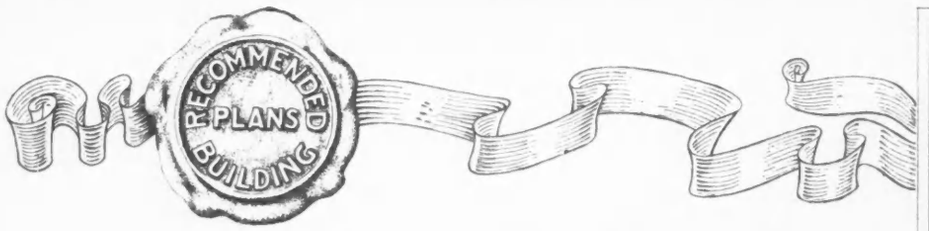
Ventilation is very important in a dairy barn and the principles for providing fresh air and exhausting the foul air, together with keeping the stable dry, are now so well understood that there is no longer any excuse for a modern, well built barn to be anything but properly ventilated.

Notice that in this barn two large galvanized iron aerators on the roof are connected with well insulated foul air flues of adequate capacity extending down through the hay mow to the stable floor. Their four outlets are sufficient to exhaust the vitiated air, the warm air rising and being sucked out through the ventilator heads. This circulation of air carries away dampness which otherwise makes a clammy, unhealthful atmosphere.





Gothic Roof Dairy Barn of Popular Size Designed and Recommended by the J. E. Porter Corporation.



THE P. T. STUART DAIRY GROUP

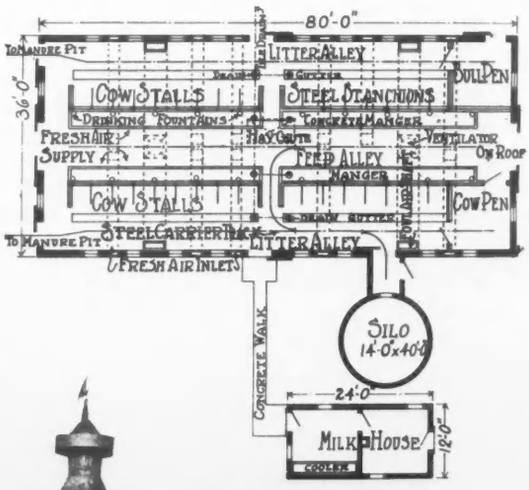
Design No. A1029

THIS is a well-planned gambrel roof barn with high basement cow stable of glazed tile, stanchions being provided for 54 cows arranged to face in. A large amount of fodder and roughage finds storage in the big mow over the stable and silage for the herd is contained in the 14-foot tile silo 40 feet high. In the foreground, conveniently placed, is the milk house of glazed tile, 12 by 24 feet. This is divided into two rooms.

The barn itself is 36 feet wide which is the standard width for a barn arranged with a double line of cow stalls facing in. The length is 80 feet. The floor plan diagram shows arrangement of overhead carriers along the litter alleys and down the feed alley with switches carrying through to the silo. Farmers generally admire the graceful massive lines of this dairy farm group. The glazed tile suggests warmth, permanency and a well-kept place. The floor in the stable and milk house are, of course, of concrete and a concrete walk connects the two.



P. T. STUART
Of Veedersburg, Ind., Vice-President Hoosier Building Tile & Silo Co.







B. B. BELL

Vice-President and General Manager, Hunt, Helm, Ferris & Company, Inc., Harvard, Ill.

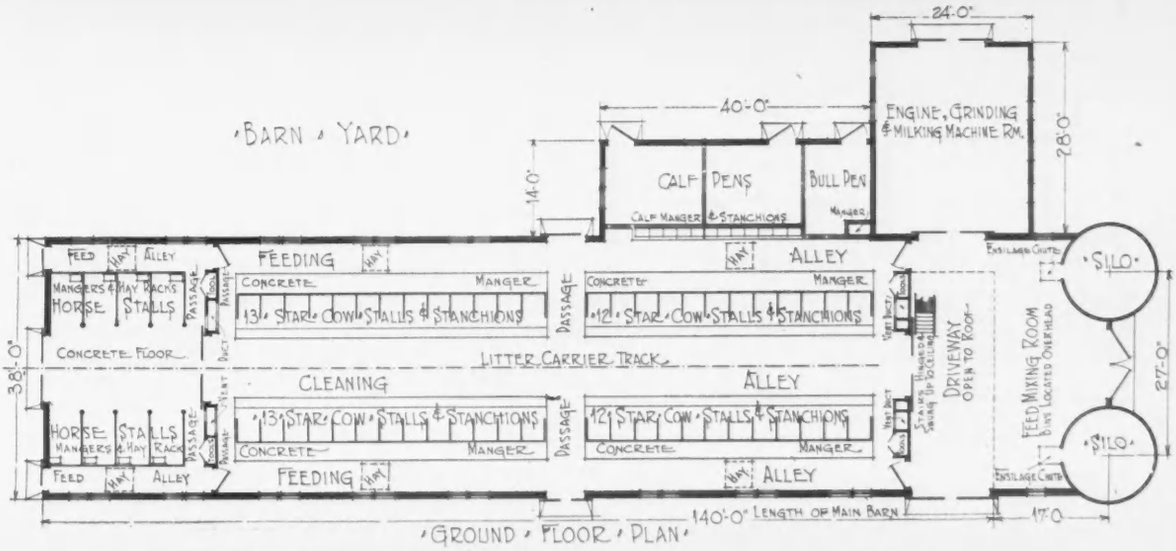
THE B B. BELL DAIRY BARN

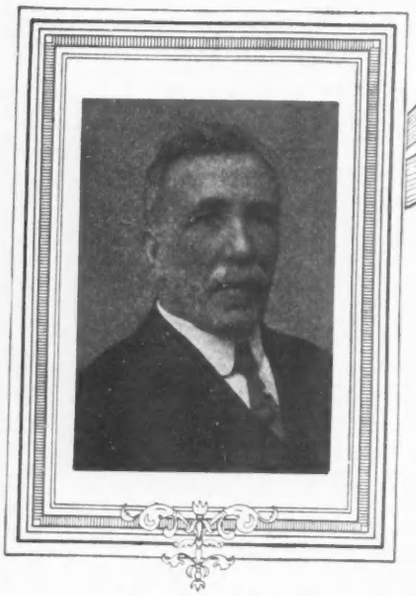
Design No. A1030

THIS modern dairy barn on the H. J. Ferris farm near Alden, Illinois, represents the very highest type of modern and efficient barn. Every practical form of equipment to save time and labor is to be found under its roof. Scientifically designed stalls and stanchions, automatic water bowls, and other devices promote the health and efficiency of the cows it houses. Everything moves in a straight line and in one direction, feed entering the barn at one end and waste material leaving it at the other.

This great barn is 140 feet long and 38 feet wide and 42 feet from grade to ridge with a hay capacity of 245 tons. It houses 50 dairy cows, facing out, has two calf pens, a bull pen and a general purpose room. The horse barn accommodating 8 horses in single stalls is separated from the cow barn by a tight partition. Full particulars concerning this or any other type of dairy barn will be gladly supplied gratis by the designer, Mr. B. B. Bell.







W. J. DEVINE
Supt. of Lindenwold Building Operations, Ambler, Penna.

RECOMMENDED HOME DESIGNS

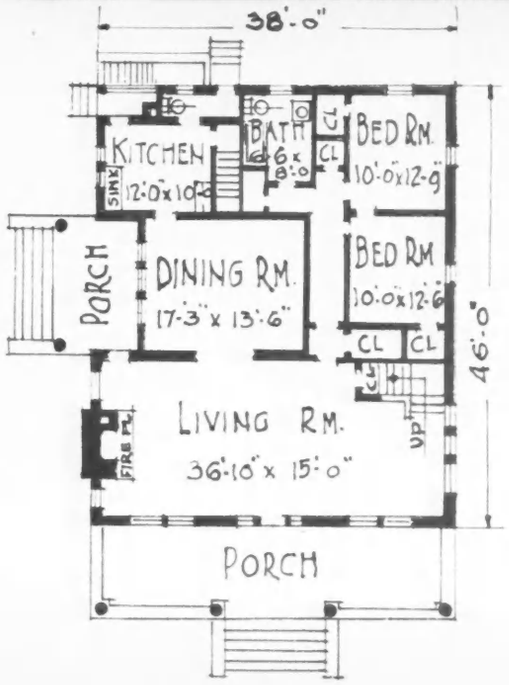
TRADE MARK

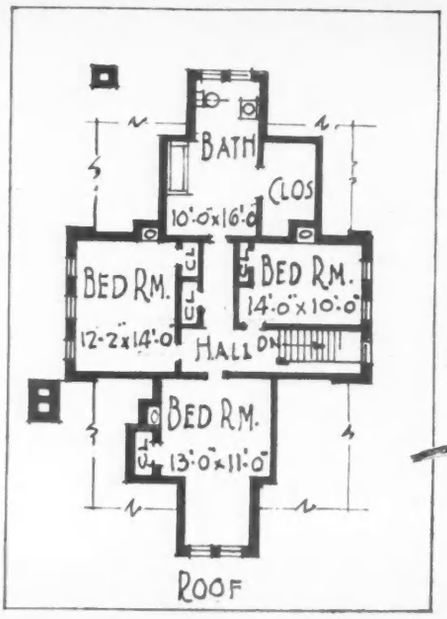
THE W. J. DEVINE DESIGN
No. 12377

THIS popular semi-bungalow design represents the ideal, fireproof moderate priced house, and marks a new era in fire safe construction by the use of fireproof asbestos building products.

The roof is covered with asbestos shingles, the sides are paneled with asbestos building lumber which is composed of asbestos fibre and hydraulic cement compacted together by tremendous hydraulic pressure. It cannot rust, corrode or decompose, never requires paint or other treatment to protect it from the cold, heat, moisture, dry winds or other weather conditions. It can be punched, filed or worked generally with ordinary tools, and nails may be driven through it. The joints are covered with batten strips of the same material. The interior is lined with special asbestos fireproof sheets, which saves two or three weeks in the time required for construction.







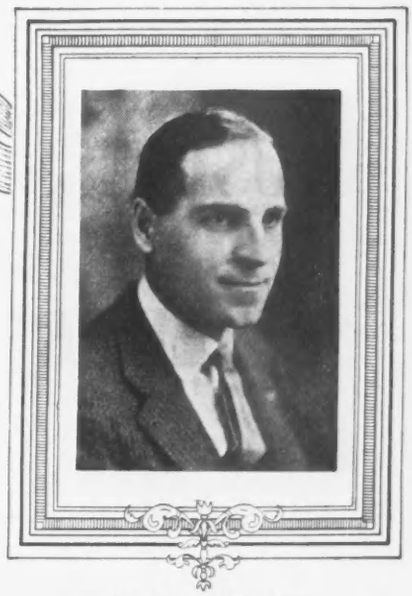


TRADE MARK

RECOMMENDED HOME DESIGNS

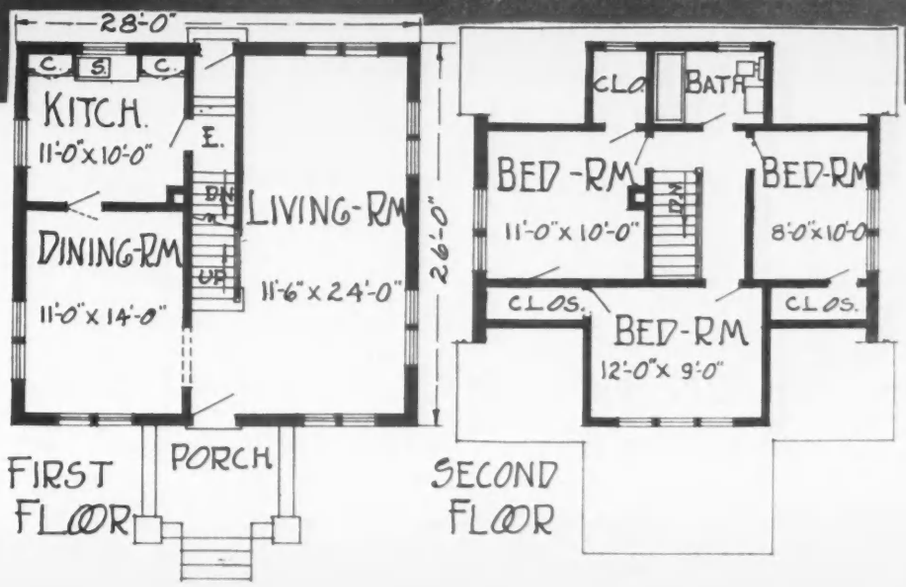
THE M. H. COOMBS DESIGN
No. 12358

A LOW COST, warmly built, permanent home is presented in this six-room design, using glazed hollow tile for the basement and side walls. In many localities this construction is the popular choice. The tile have a pleasing range of colors of a reddish brown and brownish yellow mixture, very similar to the popular rough texture face brick. The size of the unit is, of course, larger than brick, which tends to emphasize the design. The economy of this construction is in its favor, cost records on this particular home running around $5,000, including furnace, plumbing, electric fixtures, etc. The arrangement of the rooms is convenient and its exterior appearance very attractive.



M. H. COOMBS
President Kalamazoo Tank & Silo Co.,
Kalamazoo, Mich.





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1435 W. 29th St.
Phone: Drake 8233
DETROIT
3155 Grand River Ave.
Phone: Glendale 4780
KANSAS CITY
2433 McGee Trafficway
Phone: Grand 5375
LOS ANGELES
1151 Santee St.
Phone: VAndike 4196
LOUISVILLE
623 W. Market St.
Phone: City 6943,
MILWAUKEE
864 Third St.
Phone: Lincoln 912
NEW ORLEANS
508 Magazine St.
Phone: Main 7032
NEW YORK CITY
46-48 Lispenard St.
Phone: Canal 7593
OMAHA
1407 Harney St.
Phone: Atlantic 1634
PHILADELPHIA
410-412 Commerce St.
Phone: Lombard 8490
SAN FRANCISCO
1250 Folsom St.
Phone: Hemlock 1150
ST. LOUIS
2116 Locust St.
Phone: Central 8677
ST. PAUL
1930 St. Anthony Ave.
Phone: Midway 2822

Floors!

You can't hide them in a new house. They are literally under your prospect's feet every minute. They DEMAND attention.

Will they be dull, lifeless things. Or, worse yet, glaring, brittle and glassy surfaces that scare him off for fear they will scratch?

Why not show him (and her) the mellow, durable lustre of beautiful *waxed* floors? Distinctive, Serviceable, Saleable!

JOHNSON'S WAX
Electric floor Polisher

MAKES the FINEST finish in the world, the EASIEST to obtain. A tool every builder needs. For all Wood, Linoleum and Composition floors. Small, handy, a child can operate it. Imparts a burnished, durable lustre impossible by hand and does it ten times as fast. Saves Time, Labor, Money ---and makes floors that sell houses.



FREE

To Contractors and Builders we offer this New Johnson Polisher absolutely without cost. Use coupon below for our Special Free Offer!--- It will also bring Wholesale Price List on Johnson Interior Finishes.

Clip this Coupon to your letterhead or card, and mail it NOW!

S. C. JOHNSON & SON, Dept. A. B. 4, Racine, Wis.

"The Wood Finishing Authorities"

Please send details of your FREE offer on the Johnson Electric Floor Polisher. Also Wholesale Price List on Johnson Interior Finishes.

Name and address are correctly given on attached letterhead.

Signed .....

Better Plastering

Advantages of Using Better Plastering in Apartment Buildings

A THOUGHT which will be given much consideration in the next few years is that pertaining to the means by which resale value of apartments, buildings and homes can be maintained. True, there are sporadic instances where builders have given thought to this problem, but the turnover of improved property has been so rapid that the need for upkeep has not often asserted itself forcibly.

In other words, the general thought has been that if a man ordered an apartment house constructed, he must sell it quickly before any question arose as to whether its condition affected its resale value. Thus, the plumbing fixtures, the lighting fixtures, the wall decorations and other items subject to upkeep would be practically new when resold and it would not be necessary for the builder to study this problem to any extent.

Conditions in the realty field today have operated to alter this situation considerably. Large numbers of new apartment buildings have been erected throughout the country; some localities have been well-nigh overbuilt with the result that the renter has more opportunity to pick and choose. Magazines and newspaper advertising have educated him in the niceties of better appointed apartments, with the result that "For Rent" signs bespeckle many an apartment building which was in its hey-day only three or four years since. Obsolescence has entered very largely into the problem of the apartment house.

No longer is the building judged only by its outward appearance. Among the accoutrements of the well-appointed apartment which have done much to affect resale value of this type of structure is the plumbing. The development of the buyer's interest has resulted in a demand for plumbing fixtures of the type which a few years past were used only in the very highest type of residential construction. The renter in the modern apartment demands the very best in bathroom equipment and one of the first things he notes, especially in older buildings, is the quality of the plumbing.

Lighting fixtures also catch the eye quickly. A few years ago large inverted bowls for either direct of semi-direct lighting were considered the last word in illumination. Now these have been largely replaced by wall brackets occasionally supplemented by ornate candlebra, and individual floor and table lamps. Besides these the public has been educated to look for numerous convenience outlets, also necessary for electric housekeeping devices. The "period" of the house is thus often determined by a glance at the type of lighting equipment provided.

The style of wood trim used also denotes the generation in which the building was erected. Twenty years ago the most intricate mouldings were used around windows and door openings and for picture moulding. Passe now are the old time familiar plate rails with which every dining room was adorned.

But even ancient plumbing and lighting fixtures might be overlooked if kept in good shape although often replaced with those of present-day design. This, it has been quite feasible to do on account of the relative ease by which such modernization could be effected. Not so, however, with cracked and discolored plaster on walls and ceilings. As a breeding place for vermin unsightly cracks are a distinct deterrent to the prospective renter.

To her, they suggest that poor, cheap, shoddy construction was used and she will probably make a mental note to the effect that in a very short time the customary streaking of the ceiling will reappear. She also probably reflects that if inferior materials were used on the walls and ceilings other drawbacks such as noisy rooms, because of poor sound deadening, poorly fitting doors and windows and other common ailments of cheap construction are also present.

And so our prospective tenant shops around until she



Outside as Well as Inside Better Plastering Methods Can Be Used to Make the Apartment Building Attractive and Maintain Its Resale Value and Rental Value from Year to Year.

What she knows about sinks tells in home buying . . .



"UNLESS the sink is right, the kitchen can't possibly be right"—she is sure about that. She knows, too, a sink that saves time, energy, and foot-steps will lighten the care of the new home.

So when they're deciding if they shall take your house it's mighty important that the kitchen sink should catch the woman's eye.

All those features so vital to kitchen comfort are provided in "Standard" Sinks, placed "yard stick high." They are emphasized in national advertising to millions of prospective home-buyers.

You profit by this help when you specify "Standard" Plumbing Fixtures and Brass Fittings. There are "Standard" Showrooms, Branches, Warehouses in more than 50 cities from coast to coast.

Write for
"Standard" Catalogue

Standard Sanitary Mfg. Co.
Pittsburgh, Pa.



"Standard" Sinks give these things that good kitchen planning requires:

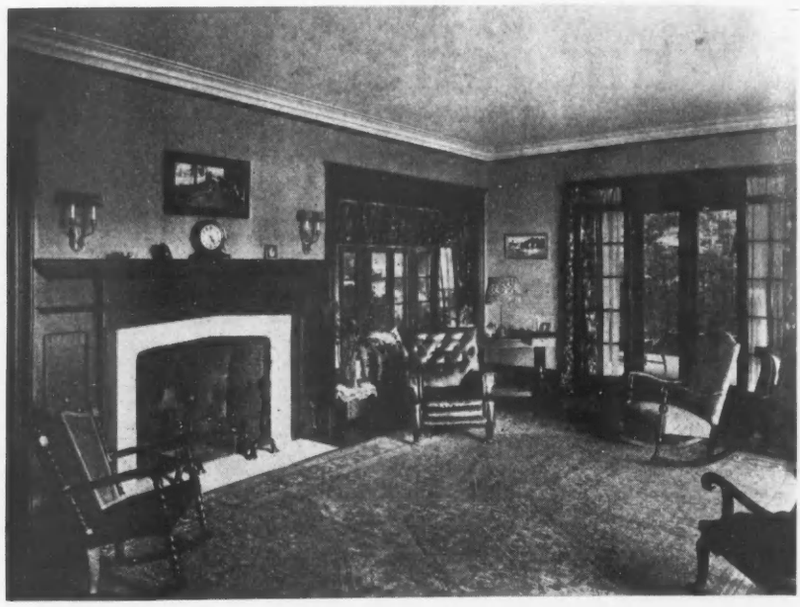
1. Right height—"yard stick high" is the comfort line.
2. Drainboard and working space a-plenty.
3. One-piece whiteness for health and labor-saving.
4. Faucet-spout that swings where needed.
5. "Tempered water," or hot or cold, from one spout.
6. Easy cleaning without a joint to hide dirt.
7. Ample width for dishes and pans.
8. Constant drainage—no water standing.
9. Splash-up back to prevent soiling of the wall.

This is the April advertisement of a series appearing in magazines and newspapers having a combined circulation of more than twenty-four million.

"Standard"
PLUMBING FIXTURES

finds a new apartment where disfiguring plaster cracks and streaks have not yet had a chance to exhibit themselves; and the owner of the older building must exert himself so much more diligently or possibly offer substantial rent concessions, to attract tenants who will overlook the faulty workmanship and material, which were built into the building. A 10 per cent vacancy is usually considered about the average in apartments, but if the building has been built as described, the vacancies may run as high as 20 per cent under the conditions which now obtain in many cities. In other words, the newer buildings instead of having 10 per cent vacancy, have perhaps 2 or 3 per cent, while the older buildings in which shoddy construction was permitted, bring the average up to 10 per cent by having an exceptionally large percentage of unoccupied apartments.

Such a condition makes insecure the investment of owners in apartment house property and is even apt to be reflected in the market value of bonds issued for its construction. The question then arises, how much additional will be the actual cost of using better plastering so that obsolescence and depreciation can be largely averted and thus maintain the rentability of apartments and insure the safety of the investment in the building.



Where Plastering Has Been Done Properly Disfiguring Cracks Will Not Appear in Walls and Ceilings and Streaking Will Not Necessitate Too Frequent Redecorating.

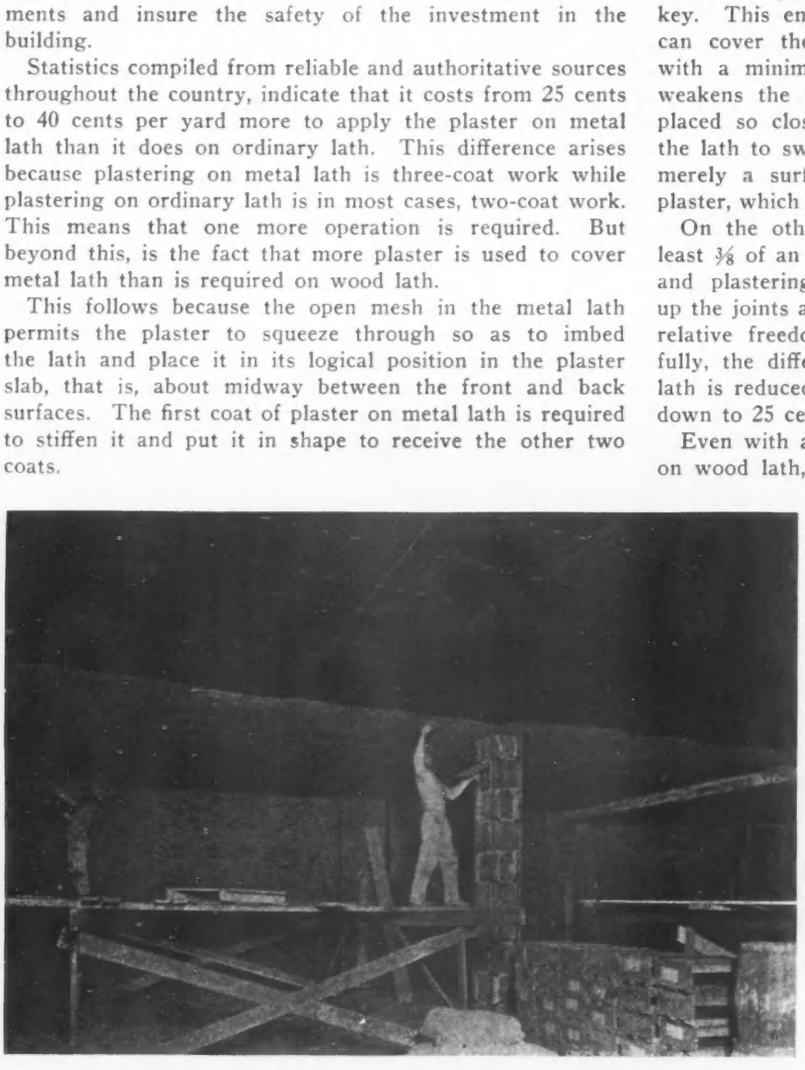
Statistics compiled from reliable and authoritative sources throughout the country, indicate that it costs from 25 cents to 40 cents per yard more to apply the plaster on metal lath than it does on ordinary lath. This difference arises because plastering on metal lath is three-coat work while plastering on ordinary lath is in most cases, two-coat work. This means that one more operation is required. But beyond this, is the fact that more plaster is used to cover metal lath than is required on wood lath.

This follows because the open mesh in the metal lath permits the plaster to squeeze through so as to imbed the lath and place it in its logical position in the plaster slab, that is, about midway between the front and back surfaces. The first coat of plaster on metal lath is required to stiffen it and put it in shape to receive the other two coats.

Against this, there is the not uncommon practice of applying wood lath so close together that there is practically no opportunity for the plaster for form an adequate key. This enables the plasterer to "skin" the job as he can cover the surface with a minimum of plaster and with a minimum of keys. Naturally, such a procedure weakens the bond of the plaster to the lath and when placed so close together there is a marked tendency for the lath to swell and crack off the key. This then leaves merely a surface bond between the wood lath and the plaster, which is subject to disintegration and plaster cracks.

On the other hand, first class wood lath, if placed at least ⅜ of an inch apart, as specified by reliable architects and plastering contractors, permits the plasterer to fill up the joints and make a satisfactory key which will insure relative freedom from plaster cracks. When done carefully, the differnce in cost between wood lath and metal lath is reduced substantially and in many cases diminishes down to 25 cents a yard.

Even with a full thickness of plaster and adequate keys on wood lath, there is still the ever-present possibility of streaking. This is caused by the great difference in the conductivity of the wide strips of lath and the narrow strips of plaster between them. Experiments have shown that with a cold attic or circulation between the floor joists, and a warm room underneath, the "sweating" of the ceiling will occur most frequently at the places on the ceiling which are just under the joints between the lath. This sweating consists frequently of only miscroscopic particles of moisture and it is on these little wet strips between the lath that any dust which is present will collect so that in time a definite dirt streak becomes apparent, and the location of each and every lath can be readily traced by a glance at the ceiling.



In Order to Obtain Satisfactory Plastering Just as Much Attention Must Be Given to the Plaster Base as to the Plaster Itself.

The same, however, is not true of a ceiling which is plastered on a metallic base. The metal acts as a temperature distributor so that the entire plastered surface is at practically the same temperature, and if any condensation takes place, it is uniform over the surface and the streaking



James Nason, President, Nason Construction Co. Swampscott, Mass.

"If home owners knew what we contractors know about home construction, every house would be insulated. I consider that Celotex fills a long-felt want in the building trade."

Celotex was used as sheathing and insulation, replacing wood lumber, building paper and any other insulation, on this house built by the Nason Construction Co.

Is it *ever* wise to build *HEAT-LEAKING* HOUSES?

"NEVER—no excuse left," say leading contractors, "now that insulation has been made practical and inexpensive."

FIVE YEARS AGO, there was some excuse for building a heat-leaking house. Insulation was an added expense—out of the question when costs had to be figured closely.

Today, something practical and inexpensive can be done to prevent heat leaking.

Building men agree that the practice of building heat-leaking houses is fast coming to an end. They say that in five years from now, perhaps less, such houses will be hard to sell—hard to rent—hard to borrow money on.

"Heat-leaking" simply means that the usual building materials do not hold furnace heat inside the house in winter and do not keep the sun's heat out in summer.

How to prevent heat-leaking at little or no extra cost

Celotex Insulating Lumber practically stops heat—shuts out wind and moisture—deadens sound

Unlike ordinary insulation, Celotex replaces other materials. As sheathing, it adds nothing to the cost of a house. Under plaster, it costs a trifle more, but gives great advantages.

As sheathing, Celotex supplies the insulation needed back of stucco, brick or wood exteriors. Here it replaces the rough boards formerly used, giving greater strength to the house walls and making building paper unnecessary.

On inside walls plaster is applied directly to the surface of Celotex. This eliminates the use of lath, and forms stronger, insulated walls, free from lath marks.

Celotex is exceptionally economical to apply—it saves labor as well as material. Celotex is made from long, tough cane fibre into broad, strong boards that can be sawed and nailed just like lumber and with less waste in trimming. Celotex comes in stock sizes: width 4′, lengths 8′ to 12′, thickness 7-16″, weight about 60 lbs. per 100 sq. ft.

Look ahead!

Progressive builders are using Celotex to get more business and to help establish their reputations for building modern, comfortable, economical houses. Celotex construction is especially valuable if you are building to sell.

Ask your architect or lumber dealer to tell you more about Celotex. All lumber dealers can supply it. Leaders in these lines advise its use.

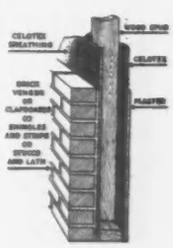
And send the coupon below for complete details that show just how Celotex is used and its value to you as a builder.

THE CELOTEX COMPANY, CHICAGO, ILL.
Mills: NEW ORLEANS, LA.
Branch Sales Offices in many principal cities
(See telephone books for addresses)

Canadian Representative:
Alexander Murray & Co., Limited
Montreal, Toronto, Halifax,
Winnipeg, Vancouver

HOW CELOTEX IS USED

Celotex is used in outside walls as sheathing, replacing wood lumber and eliminating the use of building paper. On inside walls plaster is applied directly to its surface. This eliminates the use of lath. Results: More comfort, greater strength and security, longer life and less upkeep expense.



CELOTEX
INSULATING LUMBER

THE CELOTEX COMPANY, Dept. T-144
645 N. Michigan Avenue, Chicago, Ill.
Send the Celotex Building Book and Specification Book, free.
Name .....
Street .....
City ..... State .....
Amer. Build.—4-26

is absent. It is for this reason that many builders are coming to use the metallic base for their plastering because it has been found that, whereas some apartments need decoration every year, others that are plastered on metal lath can go without decoration sometimes for two years or more, simply because of the absence of streaking and discoloration.

This matter of redecoration, now that labor and materials for this class of work have risen to such high figures, is manifestly one of large expense which in many cases forms an appreciable part of the income from an apartment building. The prospective builder or investor in such types of residential occupancy can well afford to look very carefully into this matter of better plastering, especially when it is realized that the added cost of plastering on a metallic base may in many cases run as low as 25 cents per square yard.

Considering also the matter of plaster cracks, as mentioned in the early part of this article, many a prospective renter judges the character of the building in general by the condition of the walls and ceiling corners because it is there that different types of construction, subjected to different stresses, join; the creed for better plastering has been widely adapted by better builders and includes the use of strips of metallic lath to reinforce these corners. They are, undoubtedly, the least expensive item which goes into the cost of plastering and applied over ordinary lath or plaster board, where walls and ceilings come together, the plaster is thus reinforced at its most critical point.

Tests made at the Armour Institute of Technology have shown conclusively that the cracks will not form until a load much in excess of that which will produce a crack is thrust upon the construction, inasmuch as much of the stress which causes cracks in ordinary construction, is the result of minute shrinkage of the fibres of the wood studs, which are the structural support of a wall. Therefore, as the cracks do not occur sometimes for a year after the building has been completed, it will be readily appreciated that if metal lath is used at these corners, the effect of the stresses in the wood can be counteracted so as to result in a crackless corner.



To All Appearances This Was a First Class Building but the Test of Fire Proved that Quality Was Not Maintained Under the Surface.

Thus the owner of an apartment must needs give thought to this very simple method of reducing the large expense caused by corner cracks. Two such cracks in opposite corners of a room may require its entire re-decoration at a cost which would vary anywhere from $10 to $25, depending on whether the walls are calcimined or papered, and if papered, the quality of the paper. The actual cost of building metal lath into the corners of a room will not amount to more than possibly $1 a room, so that its use can be of very material benefit to any prospective builder. In thus employing metal lath for corner reinforcement, ordinary lath can be used with comparative freedom from plaster cracks.

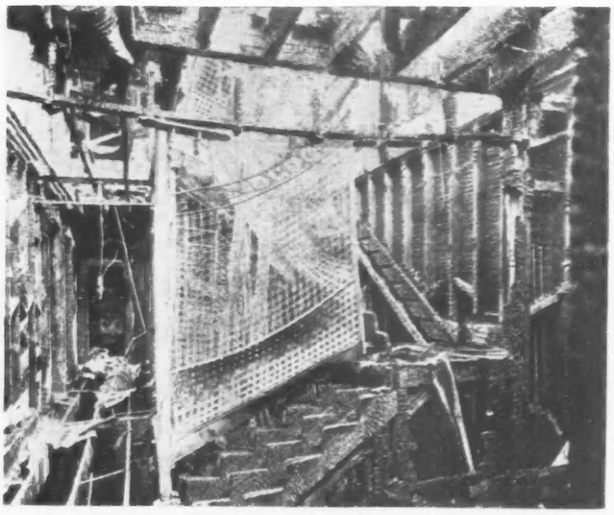
Outside of the purely commercial advantages to the owner of an apartment building, in using better plastering as a means of reducing upkeep expense and maintaining the re-sale value of his building, there is the further very important advantage of having a building which is fire-resistive to a remarkable degree. The use of metal lath as a plastering base and protection for wood studs and joists, results in what is known as "Protected Construction," which has been given a full one-hour rating by authoritative testing laboratories.

Many cities, and the codes of many states, now require this type of construction as a minimum protection for certain parts of apartment houses in order to insure safety of life to occupants. Such construction will confine the fire to its starting place for at least one hour, thus permitting the occupants to make their escape without panic and leaving ample time for the fire department to be notified and reach the fire before it has gained headway.

This type of protected construction is midway between ordinary construction, with its serious fire hazzard and resulting loss of life, and the much more expensive, so-called fireproof construction, which requires masonry walls and partitions and frequently makes the cost of apartment buildings so high that the investment involved results in high apartment rentals, which are in many cases hard to justify. They are a permanent incumbrance on the building and such apartments are at a disadvantage when compared with those of the protected type which can be built at a much lower cost.

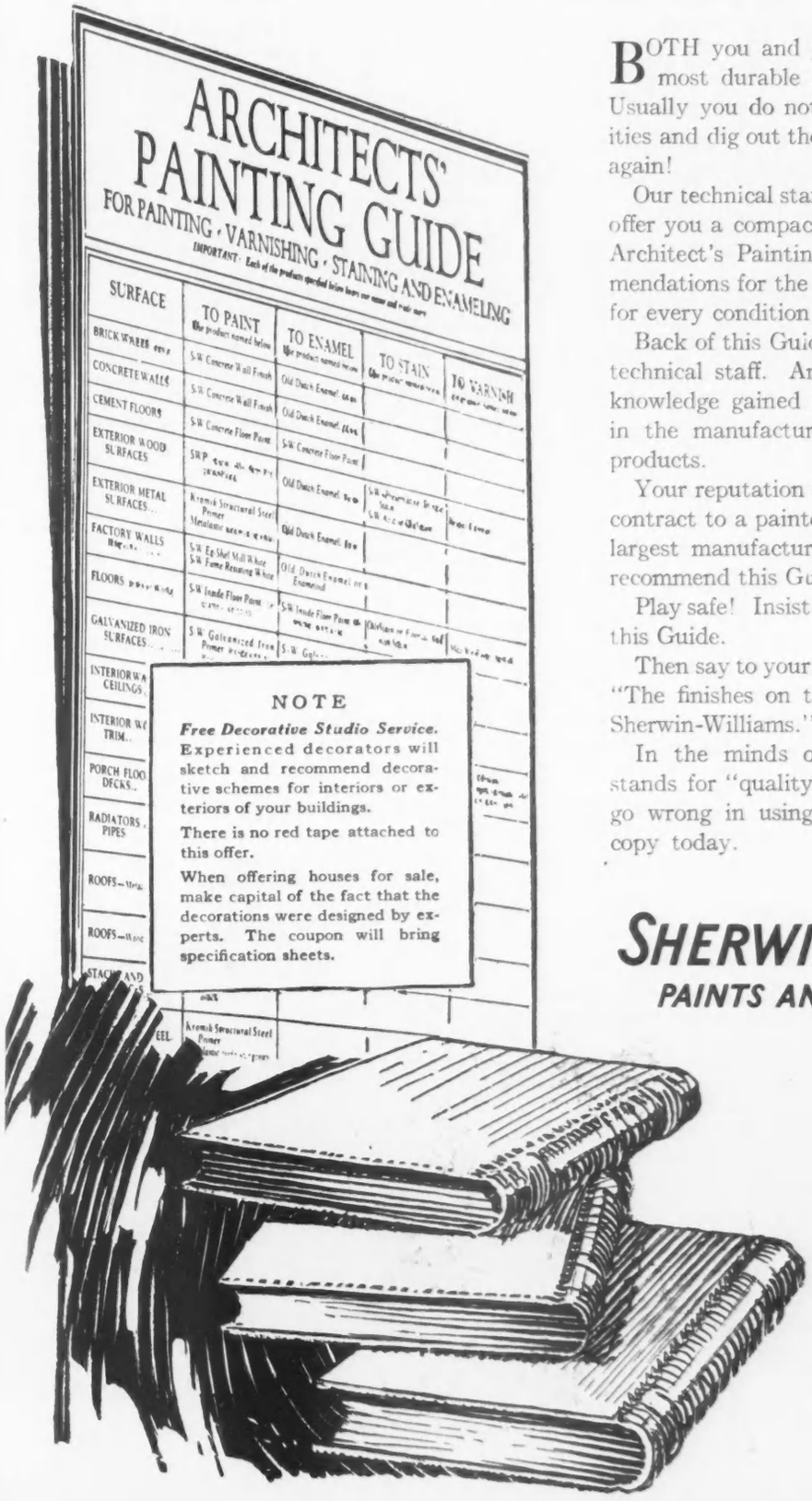
Hotel and apartment owners frequently give large display to the fact that their buildings are fireproof, and for all practical purposes the owner of a building of protected construction can similarly use the fact as a decided asset in renting apartments.

There is thus a three-fold advantage in employing better plastering: one is the dollars and cents question of reducing maintenance costs, second the reduction in turn-over by preserving a new appearance in the apartments so as to encourage the tenant to remain, which fact in turn preserves the re-sale value of the building. Third, there is the added advantage of being able to say that the building affords an unusual degree of protection for its occupants.



Better Plaster Methods Would Have Saved Much of this Destruction Which Occurred in the Building Shown at the Top of the Page.

A Novel Way of Securing the Paint Experience of Experts



BOTH you and your customers want the best and most durable finish for every surface. Granted! Usually you do not have time to delve into technicalities and dig out the information you require. Granted again!

Our technical staff has done this digging for you. We offer you a compact fund of paint information in the Architect's Painting Guide. It gives definite recommendations for the most durable and protective finish for every condition of surface and wear.

Back of this Guide is the practical knowledge of our technical staff. And back of *them* is the cumulative knowledge gained through sixty years' of experience in the manufacture of paints, varnishes and allied products.

Your reputation is at stake every time you let a subcontract to a painter. The reputation of the world's largest manufacturers of paints is at stake when we recommend this Guide to you.

Play safe! Insist that your painting contractor follow this Guide.

Then say to your customers and prospective buyers—"The finishes on this job are *right*. They are 100% Sherwin-Williams."

In the minds of the public, "Sherwin-Williams" stands for "quality in paints." Therefore, you can't go wrong in using this Guide. Send coupon for a copy today.

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PAINTS AND VARNISHES
COVER THE EARTH

The Sherwin-Williams Co.,
407 Canal Rd., Dept. D, Cleveland, Ohio

☐ Send me copy of Architectural Painting Guide.

☐ Send me your specification sheet. I am building..... (fill in kind of buildings) and would like to receive suggestions from your Decorative Studios. No obligation.

Name.....

Street..... *Place*.....

Quick Hardening Concrete

Improved Methods of Mixing, Placing and Curing Concrete Save Time and Money and Insure a Stronger Product

INCREASED profits for contractors, dealers, engineers, owners and others in the building field, on jobs in which time is an important factor, are made possible by improved methods of mixing, placing and curing concrete, recently made public, which result in strong concrete in three days.

All work, of course, does not require speed in construction. In some cases people can wait the usual length of time for concrete to reach the desired strength. But on many kinds of new or repair projects speed is essential. In such cases it means more profits for those doing the work and earlier use of the improvement by the owner or the public.

How Builders Profit

Types of jobs in which quick construction is profitable readily come to mind. Basements and walls either for new homes or other buildings or for alterations in old ones; sidewalks, steps or platforms in busy locations; pavement intersections where traffic cannot long be tied up; floors in factories which do not want to stop operations for repairs; foundations under engines or power machinery which must be put in quickly to avoid costly shut-downs, and repairs or replacements in stores, banks, school houses and similar places where quick work is required to prevent inconvenience to the public or loss to business—these are some of the improvements where speed profits every one concerned.

Usually, concrete work is allowed to stand many days—in some instances weeks—before it is used. In cases like the above, however, where time is an important consideration, the builder, owner or public does not want to wait the usual length of time for concrete to reach a given strength and it is not necessary to wait. Through the careful use of methods recently announced, the builder can secure strong concrete in three days. These methods, which are based on thousands of laboratory tests extending over many years and on actual construction experience, are being profitably employed on many jobs throughout the country where speedy construction is desired.

In addition to saving time, the methods possess special value in the case of winter work. Their advantages in cold weather construction were demonstrated, for example, by city engineers on a job in Chicago which needed quick attention. It was a point where traffic was heavy and continuous. The time was January, the weather was zero. The repairs had to be made in a hurry to avoid tying up traffic. The Department of Public Works met this need when it secured at slight extra cost, concrete of the required strength by using cement according to the methods described in this article. The improvement was completed and in less than three days was in use by the public. The time and money saved the city by these methods will result in their use on other municipal projects where speed is desired. Concrete of this quality has sufficient strength to prevent damage by freezing sooner than concrete mixed and placed in the ordinary way. It therefore profits the builder by reducing the time necessary to protect it from the cold.

Makes Strong Concrete

While such concrete is well adapted for winter work because its high, early strength quickly prevents it from being damaged by freezing and reduces the time and cost of protection, it is also profitably used throughout the year on certain jobs where strength as well as speed is needed.

An illustration of this occurred in connection with paving done in the early spring. Not only was speed necessary to prevent tying up a thoroughfare over which hundreds of trucks passed daily, but an exceptionally strong pavement



This Road, Built According to the Methods Described in This Article, Was Put Into Service Carrying Heavy Truck Traffic Within Three Days After Laying and Showed No Injury as a Result of the Burden Placed Upon It.



This flour-like fineness means dollars and cents to you!

PROBABLY no other single Carney advantage gets more praise, or is more talked of by contractors, than its unusual fineness. This flour-like fineness of Carney means much to you. It ends a time-wasting nuisance—soaking.

When Carney is delivered on a job, it's ready for instant use. There's no time lost in soaking and adding lime. All the mixer needs to do is add four parts sand and water.

Every time you use Carney you cut a big chunk from your mortar costs. You save five per cent (5%) on cement (Carney takes 4 parts sand instead of 3). Two men can mix as much mortar with Carney as three men can produce with ordinary cement. Put Carney on your next job — from then on, you'll be a Carney booster.

"Masonry on the Bell Building has just been completed and the writer wants to state a few facts regarding the speed and economy of construction.

From the 4th floor to the 21st floor, 3½ stories of masonry were completed every week. 52 terra cotta setters, 48 brick layers and 6 apprentices bricklayers composed the crew responsible for this speed. Two good Italian laborers mixed all the mortar for this job in an electric driven mortar mixer. One part Carney's, four parts lake sand was used for all terra cotta, face, common and hollow brick.

One kind of mortar, good plant arrangement and ease and quickness of mixing made it possible to have the lowest unit cost of mortar in the experience of the writer."

W. G. OBERMEIER,
Supt. Bell Job,
McLENNAN CONSTRUCTION CO.,
Chicago, Illinois.

THE CARNEY COMPANY

District Sales Offices: Cleveland, Chicago, Detroit, St. Louis and Minneapolis.

Specifications:
1 part CARNEY
to 4 parts sand.

Cement Makers 

Since 1883

CARNEY
for Brick and Tile Mortar

Quick Hardening Concrete

Thousands of Laboratory Tests and Actual Construction Experience Show How to Get Quick-Hardening, Strong Concrete in 3 Days

	Mix	Bbls. Cement Per Cu. Yd. of Concrete	Gallons Water Per Sack of Cement*	Approx. Slump Inches	Lbs. $CaCl_2$ Per Sack of Cement†	Minutes Mixing Time	Compressive Strengths Pounds Per Square Inch			
							1 Day	3 Days	7 Days	28 Days
A	1:2½:4	1.4	7.7*	6 to 8	0	1	240	750	1320	**2600**
B	1:2½:4	1.4	7.7*	6 to 8	0	5	340	910	1550	3030
C	1:2½:4	1.4	6.1*	½ to 1	0	1	520	1350	2090	3700
D	1:1½:2½	2.1	5.5*	6 to 8	0	1	560	1580	2530	4230
E	1:1½:2½	2.1	4.4*	½ to 1	0	1	880	**2410**	3630	5250
F	1:1½:2½	2.1	4.4*	1	0	5	1150	2860	4020	5740
G	1:1½:2½	2.1	5.5*	6 to 8	2†	1	930	1880	**2610**	3800
H	1:1½:2½	2.1	3.4*	0 (Dry) ‡	2†	5	1910	3380	**4200**	5260
U	1:1¼:2½	2.25	4.6*	½ to 1	0	5	1580 (Concrete used in road shown in illustration.)			

*Total water, including the moisture in aggregates as used.

‡Stiff mixtures must be tamped into place.

†In using calcium chloride ($CaCl_2$), thoroughly dissolve 100 pounds $CaCl_2$ in water so as to give a total of 50 gallons of solution. Replacing one gallon of mixing water per sack of cement with one gallon of this solution gives right amount of and right method of using $CaCl_2$.

was required to carry the heavy industrial traffic. Both of these two needs were met by careful application of the methods described. The pavement was opened to use when less than three days old and since then has been subjected to continuous heavy truck traffic, as is shown in the picture, without any damage to the concrete. (See concrete "U" in above table for mix, water content and strength of this concrete.)

Superior at All Periods

In addition to profiting the builder by saving time, expediting winter work, and securing strong concrete quickly, the methods benefit further by insuring concrete that is forever after superior to the concrete mixed and placed according to the usual methods. Quick-hardening concrete, secured by these methods, is thus not only quality concrete at the start, but at 28 days, 6 month, 5, 10 or 15 or more years, is stronger than concrete as ordinarily placed. It is profitable, therefore, not alone when the job is done, but always thereafter.

The importance of this concrete is revealed when its high early strengths are compared with strengths developed by the usual methods. A good concrete such as is commonly used in building construction work is proportioned, say, one sack of cement to 2½ cubic feet of good sand and 4 cubic feet of crushed stone or pebbles, graded in size from ¼ inch up to 1½ inch material. If to the materials (figured dry), 7.7 gallons of water for each sack of cement are added (this includes moisture in aggregates as used) and the mixing time is one minute, a concrete will be produced with the strength at different ages, shown in line "A" of the table shown at the top of this page.

Note that concrete "A" has 240 pounds compressive strength per square inch at one day, 750 pounds at three days, 1,320 pounds at seven days and 2,600 pounds at 28 days. But quick-hardening concrete with higher strength than concrete "A" in three days is wanted.

Concrete "C" in the table is the same in every respect as concrete "A" except that the volume of mixing water has been reduced from 7.7 to 6.1 gallons per sack of cement. This one change produces an increase in three-day strength of 600 pounds or 80 per cent. Compare strength at all periods of mix "A" and "C" and note marked effect of using less mixing water. Similarly, reducing the mixing water of concrete "D" from 5.5 gallons to 4.4 gallons increases the strength to that shown in table for concrete "E." Compare "E" with "D." (Mixtures of a stiff workability like "H" must be tamped into place.)

The effect produced by increasing the amount of cement is shown by concrete "D" in the table. This has 0.7 of a barrel more cement per cubic yard of concrete than concrete "A." Note that this increase of only 50 per cent in cement more than doubles the three-day strength. Compare "D" with "A." While "A" and "D" have a different water content per sack of cement they have the same slump. Mix "D" has less total materials per one sack batch than mix "A" and therefore requires less water per sack of cement to wet the materials to the same consistency. The workability of "D," however, is even better than "A" because a concrete rich in cement is easier to place and therefore is more workable than one having the same slump but less cement per unit volume.

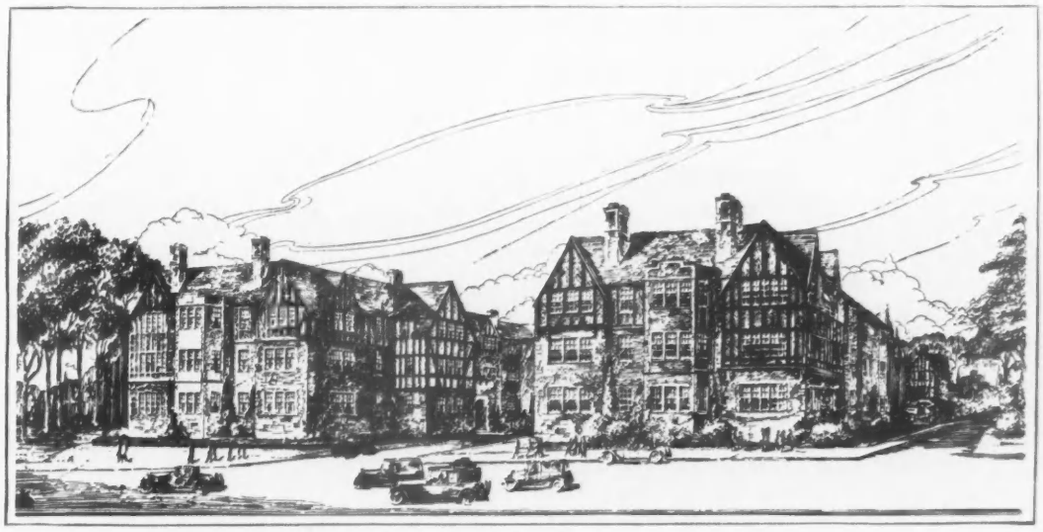
Mixtures rich in cement and with a comparatively small amount of mixing water require thorough mixing to insure a uniform concrete. Compare "B" with "A" and compare "F" with "E" and note increase in strength due to increased mixing time. For machine-mixed concrete the mixing time should never be less than one minute and any added mixing time up to five minutes improves quality and increases the strength of concrete.

Good concrete (see concrete "A") ordinarily has a strength of 2,000 pounds or more at 28 days. Two simple changes produce a concrete (see concrete "E") with a strength of 2,000 pounds or more in three days. These two changes are: decreasing the volume of mixing water and increasing the quantity of cement. This quick-hardening concrete has the required strength in three days and in addition is much better and much stronger at all periods. Compare "E" with "A" and note that concrete "E" not only has a three-day strength of over 2,000 pounds but that its 28-day strength is more than double the 28-day strength of "A."

Use of Calcium Chloride

Still higher strength concrete at three days is obtained by adding 2 pounds of calcium chloride per sack of cement: compared "G" with "D." Further reducing the volume of mixing water, increasing the mixing time, and adding calcium chloride, increases the strength: compare "H" with "G."

The best way to use calcium chloride in the field is to add 100 pounds of commercial calcium chloride to about 40 gallons of water in a barrel of at least 50 gallons capacity. Stir until the calcium chloride is thoroughly dissolved, add sufficient water to make 50 gallons of solution, and a standard solution with two pounds of calcium chloride to



YORK LYNNE MANOR, Overbrook, Pa., financed by G. L. Miller & Co., Inc.
Wallace and Warner, Philadelphia, *Architects and Contractors*

Make sure your building will be ready for next season

RIGHT now many builders in many sections of the country are experiencing the difficulties of trying to get construction finished for occupancy on a rigidly laid out schedule. There is every evidence of the absolute necessity of an early start. The present is not too soon to plan the financing of work that is to be ready for occupancy next fall and winter.

It is only wisdom to consult on financing an organization thoroughly acquainted with local conditions. G. L. Miller & Co., Inc., knows building conditions in all sections of the country and the requirements for income-earning structures. Our architectural and engineering departments are ready to co-operate with owners, architects and builders as to the type and size of structure needed. Often they can increase the income-earning capacity of operations, and save money in construction.

If you have a *sound* building project which can stand the strictest scrutiny and which needs financing, we should like to hear from you. We are now ready to consider applications for financing income-earning structures — hotels, apartment houses and office buildings requiring from $250,000 to $5,000,000 or more.

"The Miller Plan" explains this modern method of construction finance. A copy should be in every builder's office. Write today for a free copy of booklet 4LG.

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INCORPORATED

Northern Headquarters, 30 East 42nd St., New York City
Southern Headquarters, Hurt Building, Atlanta, Ga.

a gallon of water is obtained. Replacing one gallon of mixing water per sack of cement in a batch of concrete with one gallon of this standard solution gives the right amount of calcium chloride and the right method of using it.

Effect of Temperature and Curing

The results shown in the table are for concrete placed and maintained at a temperature of at least 70 degrees F. for the time indicated. Further increasing the temperature of the mix and the temperature during the curing of the concrete and at the same time keeping the concrete damp, will give still greater strengths than are shown in the table. The use of steam at a few pounds boiler pressure for curing will also greatly accelerate the rate of hardening of concrete and increase the three-day strength. Steam is available and may be used to advantage in many places and on many jobs.

Concrete made according to these methods not only has a strength of at least 2,000 pounds in three days but is much better and much stronger than concrete as commonly made. This quick-hardening strong concrete is obtained by applying factors 1, 2, 4, 5 and 6 below. The strongest concretes are obtained by taking advantage of all seven of the following factors that contribute to increased strength and that construction experience and thousands of laboratory tests prove will give such concrete:

(1) Decrease the amount of mixing water. (Stiff mixtures must be tamped into place);
(2) Increase the amount of cement;
(3) Increase the mixing time. (Never less than one minute; additional time up to five minutes is still better);
(4) Place concrete at a temperature of at least 70 degrees F.;
(5) Keep concrete at a temperature of at least 70 degrees F. for the days indicated;
(6) Keep concrete damp for the days indicated;
(7) Use calcium chloride (where tests show it increases strength).

Increased profits to people interested in building follow the use of these time-saving methods on jobs where speed is required. Care, of course, must be taken in closely observing the details that are necessary to insure this strong concrete in three days. Neglecting to use the proper volume of water, cement and aggregates or to place and cure the concrete as described naturally will prevent securing the strengths shown in the table in the time indicated. But he who scrupulously observes the essentials will profit by securing concrete that can quickly be put into service, that is of particular value for winter use, that is strong at the start and much stronger and better in every way forever after than concrete mixed, placed and cured in the usual manner.

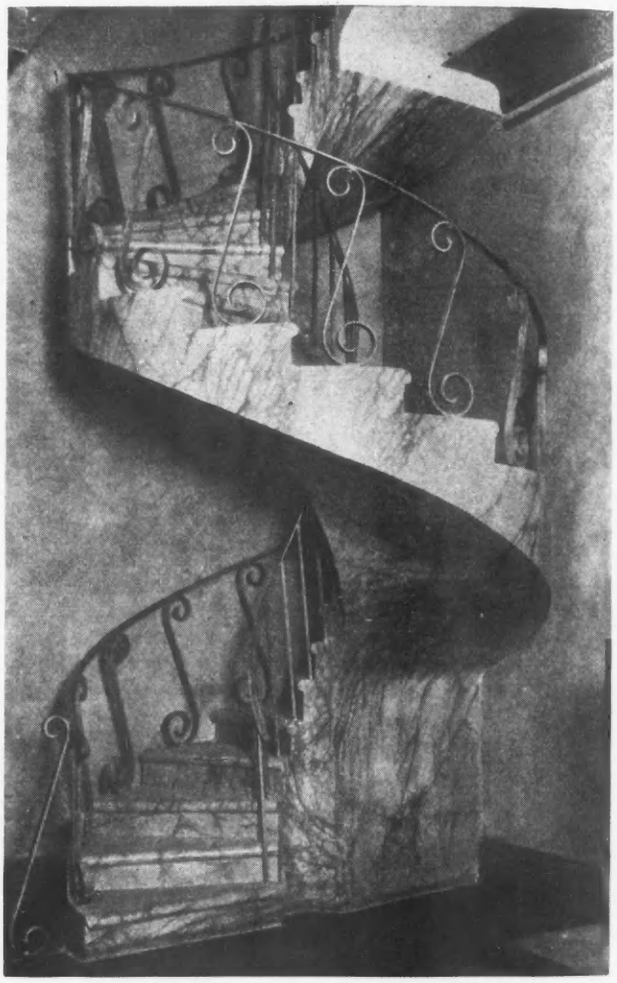
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Concrete Staircase Without Core Has Great Strength

WHAT is declared to be the only staircase of its kind in existence has recently been completed in a Florida printing plant. It is a spiral staircase of reinforced concrete and has no central support. It has been built in defiance of all the generally accepted prime theories of architectural engineering.

It was planned and built by a practical construction man, J. W. Ricketts, for Parker Printing Co., Coral Gables, Fla., against an architect's recommendation. The mould was built conforming exactly to the measurements, reinforcing was set inside, and the concrete was poured. When the mould was removed, a perfect cast was revealed.

The staircase can withstand a strain of 170 tons, with a carrying capacity of 4,800 pounds. With the exception of the two bottom steps it has no supports whatever in the course of its upward spiral, as it is built on the principle of a perpendicular balance. GEORGE F. PAUL.



Probably the Only Existing Reinforced Concrete Staircase Without a Central Core Is Designed on the Principle of Perpendicular Balance.

✣

Time Schedule for Estimates

BECAUSE of the need of some agreement on the minimum time required to figure an estimate and submit bids for various types of structures, the Southern California Chapter of the Associated General Contractors of America, recently appointed a committee to study the situation and submit a report. A schedule has been prepared which it is believed will give the contractor a fair number of days in which to prepare estimates.

Class	Class of Structure	To $25,000	$25,000 To $50,000	$50,000 To $100,000	$100,000 To $200,000	$200,000 To $400,000	$400,000 To $700,000	Over $700,000
A	Theatres, Large Schools, Clubs, Hospitals, Banks, Churches	8	10	12	14	16	22	30
A	Hotels, Office Buildings, Apartments	7	8	10	12	14	18	24
A	Factory and Loft Buildings, Warehouses	7	8	9	10	11	16	20
C	Theatres, Schools, Churches, Clubs, Banks, Hospitals	8	9	10	11	12	18	....
C	Apartments, Flats, Office Buildings, Stores	7	8	9	9	10	16	....
C	Warehouses, Garage Buildings, Factories	7	7	7	8	8	....	....
D	Residences, Flats	6	8 to 12	....	....	....	....	....
D	Sheds, Warehouses	6	8 to 10	....	....	....	....	....



With the confidence that you pick up your saw

Reach for your bevel, your level, your try square or gauge in the same way.

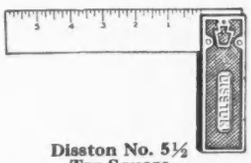
Don't be satisfied to do the rest of the job with ordinary tools.

For Disston makes tools just as good as the saw. As good in materials, in craftsmanship, in finish—and in exclusive features, invented by Disston, that help you do better work.

There's a bevel lock that will interest you. And an adjusting feature on the level that always keeps it true.

Ask your hardware man to show you these, and other Disston Tool features.

These are some of the Disston tools that will give you the same keen satisfaction that you get from your Disston Saw.



Disston No. 5½ Try Square

Toughened blade of Disston Steel fastened accurately to nickel-plated iron stock with heavy steel rivets. An assembly that can not work loose. A reliable tool that will always be accurate.



Disston No. 3 Bevel

Has the patented Disston Lock that actually holds the blade at any angle. Just a quarter turn of the thumbscrew locks it. Nickel-plated iron stock. Toughened steel blade.



Disston Adjustable Plumb and Level

The Disston No. 16 is a popular model at an attractive price. Fitted with the Disston Adjustment, which is positive and simple. Operated by screws working in wood. No springs to get out of order.

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Makers of "The Saw Most Carpenters Use"

Philadelphia, U. S. A.

DISSTON

SAWS TOOLS FILES

A New Type of Combined Arch and Network Roof

It Features Economy, Rapid Erection, Resistance to Stresses, Fire Resistance and Collapse Protection

RECENTLY, there has been introduced in this country a type of roof construction which has been employed successfully in Europe for several years and which possesses quite novel and practical features. This method of construction is patented and the company holding the patents is licensing agents throughout the country for the production of such roofs.

The new type of roof is of wooden construction and forms an arched roof made up of diamond shaped figures of uniform size constructed of short lengths of lumber to form a single girder. It is a network of ribs held together by standard bolts, nuts and washers. It is applicable to spans up to 150 feet and can be adapted to any type of roof construction. The interior of the building is left free of columns, posts, and girders and the thrust of the arch is taken up by a trestle or buttress construction or by slender tie rods.

The ribs of which the arch is formed and which are known as lamellas, are all of the same size for any one roof. They have a length of from 6 feet, for small cottages, up to 12 feet for spans of more than 100 feet. The thickness varies from 1 to 3 inches and the width from 8 to 12 inches. The unit is a straight piece of lumber curved on one edge, beveled at both ends and with holes bored at center and ends to take the bolts.

The manufacture of these lamellas is simple, the only machinery required being a circular saw for cutting lengths and bevels, a band saw for cutting the curved edge and a drill for making the bolt holes.

Construction is equally simple, the units being bolted together to form a uniform network. Ordinary commercial bolts are used and these are protected on both sides by curved iron washers. The joints formed are such that they adjust themselves to the shrinkage of the wood and the washer locks them so that it is not necessary to readjust the bolts at any time. No crane or other lifting device is required as the lamellas are light in weight and easily handled by the men. Only light scaffolding is needed to support the roof till joined at the center. The men work from top of lamellas.

The rapidity with which the work can be accomplished is shown by the fact that it is common to erect from 2,000 to 3,000 square feet of roof surface, in one building, per day. This, of course, effects a decided economy in labor costs.



A Garage Building Where the Lamella Roof Construction Has Been Used to Good Advantage. This is the flat, segmental arch type with the thrust taken up by tie rods which can be seen suspended from the roof. The pipes shown in picture are sprinkler pipes.

JOHNS-MANVILLE
Asbestos Shingles



10,000 fire chiefs are voicing a demand for FIRESAFE roofs

AS surely as time passes, all fire authorities will ultimately demand fire-safety for every roof in thickly populated communities.

In the meantime the public is recognizing the need and asbestos shingle sales are yearly showing a remarkable increase.

JOHNS-MANVILLE Inc., 292 Madison Ave., at 41st St., N. Y. C.
Branches in 63 Large Cities
For Canada: Canadian Johns-Manville Co., Ltd., Toronto

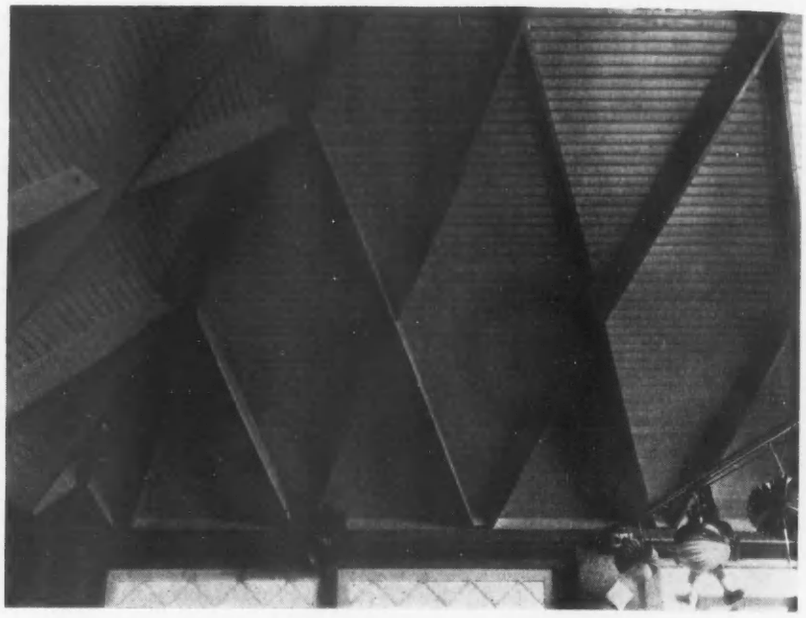
Through Asbestos and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

A New Type of Roof

The completed roof may be covered with any kind of roofing, tile, slate, sheet metal, asbestos, shingles, tar paper and so forth.

Construction of this roof can be started from the ground level for nearly all purposes, for barns, cottages, storage sheds and buildings up to 150 feet span. It can also be built on top of houses of any size and walls of any height. It has been used satisfactorily for cottages, churches, dwellings, garages, moving picture theaters, barns, storage sheds, hangars, agricultural halls, industrial buildings, factories and practically all types of buildings.

It is claimed that this roof is more fire resistant than any other timber construction for two reasons. The first is that there are no posts or internal columns which, placed between combustible merchandise, can spread the fire and, in case of fire, the roof is easily reached by the fire department. Second, in case the roof does catch fire and some of the lamellas are destroyed, the roof will not collapse because the stresses of the burned lamella will be taken up by the remaining lamellas. Other construction, even in steel, where trusses are used, will collapse if one of the trusses is destroyed. When units have been destroyed by fire or damaged in any manner, they can be easily and quickly replaced and if the bolts are destroyed, for instance by the gases from locomotives, they are easily replaced without the necessity of supporting the roof during the process.



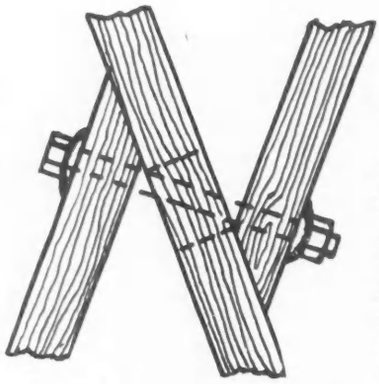
One Corner of a Large Exhibition Hall Gives a Clear Idea of the Appearance of this New Type of Roof Construction Which Has Recently Come to Us from Europe.

The quality of lumber used in the manufacture of these units is No. 1 common and a variety of kinds of wood have been successfully used. In the South it has been found that long leaf yellow pine is probably the material best adapted to large spans and short leaf pine for shorter spans. In the West Douglas fir has been used.

The roofs constructed by this method are of four types:

The flat, segmental arch roof has the thrust taken up by tie rods. This roof, the rise of which is about one-sixth of the span, is used mostly for garages, factories, car barns, hangars and various kinds of industrial buildings. Segmental arch roof, the thrust of which is taken up by buttresses, concrete piers or wooden bents, represent the second type. This is adapted to warehouses and exhibition buildings. The Gothic arch is especially adapted to churches, residences, barns and warehouses where goods are stored in bulk, such as grain or ore. With these the construction may start at the ground level. The broach or circular roof is used principally for exhibition buildings where a particular architectural design is desired. This construction is very economical. It utilizes short lengths of lumber which in the past have been wasted or sold at a very low price. No special skill is required.

The completed roof has remarkable strength because of the combination of arch and network. This construction has been proved under the most severe tests and it is considered particularly adapted to regions subject to severe wind storms. When sheathed on both sides the closed air spaces afford a high degree of insulation and there is always a good distribution of light because of the absence of disturbing cross-beams. Full use of space is another of the advantages which it affords.

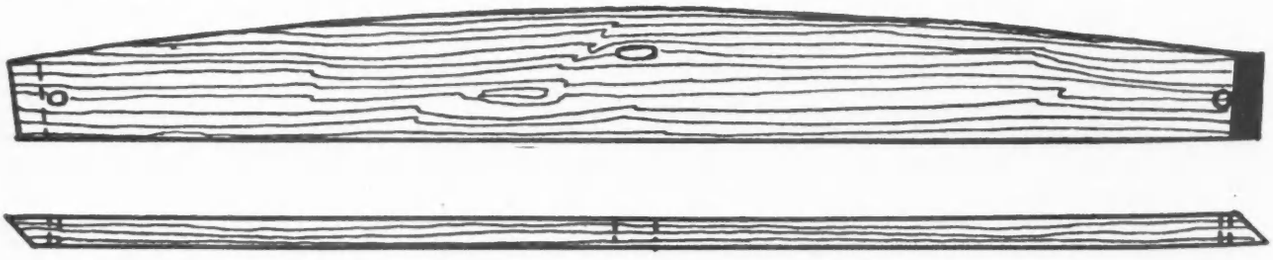


The Units of This Roof Are Bolted Together with Standard Bolts Which Take Up All Shrinkage.

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American Stove Handbook

THROUGH error the following notice appeared on page 244 of the February issue, in the department of "Books, Bulletins and Catalogs": "The Richardson-Briggs Co., Cleveland, Ohio, has published a 'Handbook on Gas Ranges for Architects and Builders' which contains complete information on its ranges in an interesting and attractive form." The Richardson-Briggs Co. does not manufacture ranges but is an advertising agency and in this capacity compiled the handbook listed for its clients, the American Stove Company, 233 Chouteau Avenue, St. Louis, Mo.



Each Unit, Known as a Lamella, Is a Board with One Curved Edge, a Hole at Each End and a Slot in the Center. The holes and slot take one or two bolts used in construction and the beveled edges permit the units to fit together in a continuous network.



A beautiful effect obtained with a Bishopric unit wall of Ivoril Cream (spatter dash) on a half-timbered English style home.

The charm of colored stucco

in a permanent *unit wall*

A rare new beauty in stucco with complete assurance of strength and durability! Thousands of builders are getting it today with Bishopric.

For Bishopric is a *unit wall* construction. It consists of (1) a patented base, (2) a stucco, and (3) an attractive color finish as shown on the right.

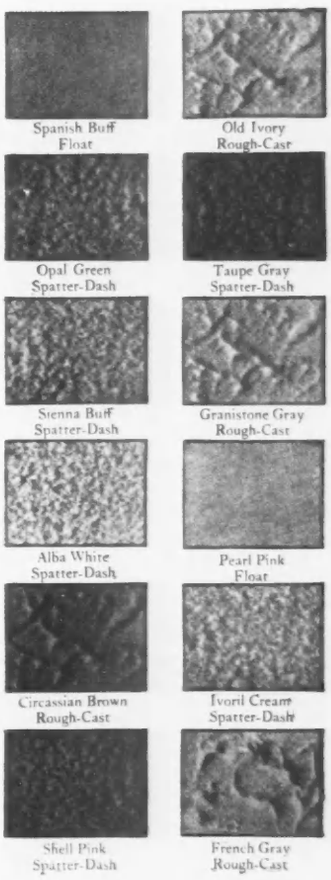
All three materials are designed and made to be used together. They combine to form a *unit wall*—as opposed to a wall made from miscellaneous materials mixed together.

The result is a coherence and strength of construction obtainable only with Bishopric. The diagram on the next page illustrates clearly why this is so.

Write for FREE BOOK

You cannot realize the amazing possibilities of stucco until you have read our beautiful de luxe booklet *The Renaissance of Colored Stucco.* It is fully illustrated in color and is packed full of valuable information. It is free to you. *Write for it today!*

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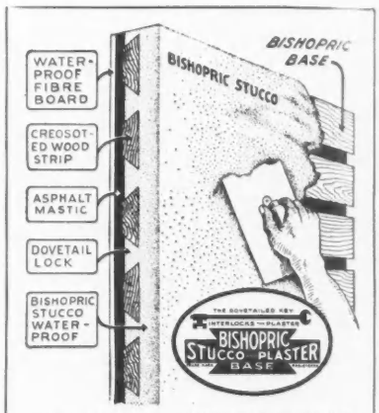
B I S H O P R I C

BISHOPRIC INTERLOCKING BASE FOR STUCCO OR PLASTER

Made by
THE BISHOPRIC MANUFACTURING CO.
CINCINNATI, OHIO

Products

Bishopric Stucco (described on next page), Bishopric Stucco Base and Plaster Base (described on this page) and Bishopric Sunfast Finish for stucco walls (described on next page).



BISHOPRIC INTER-LOCKING BASE AS IT APPEARS ON THE WALL. Bishopric Stucco being applied over it.

An Insulating Reinforcement, Especially Designed for Stucco Work

Bishopric Base (or "Bishopric Board" as it is sometimes called) is designed especially for stucco work. It has been tested in thousands of buildings for a quarter of a century and is specified by leading architects and used by builders everywhere.

Eminent Architect Uses Bishopric Bases for his Own Buildings

When an architect who stands at the top of his profession uses a building material in his own buildings you may safely follow his example. Ernest Flagg, architect of the Singer Building, New York; the Corcoran Art Gallery, Washington, D. C.; and many other notable edifices, illustrates in his book "Small Houses," a number of model homes he is erecting on his estate on Staten Island, New York. Among these are several half-timbered houses and on the plans "Bishopric" is indicated as a base for the stucco fill between the timbers.

Bishopric Inter-locking Base

Bishopric Base is the ideal foundation or backing for stucco work. It is a combination of building paper, sheathing, and insulation, none of which is required when Bishopric Base is used. It is made by heavily coating a fibre board with asphalt mastic and then pressing into the asphalt while still hot, evenly spaced, beveled wood bars. When nailed to the studs it forms a strong, rigid support for the stucco which keys perfectly between the wood bars.

Economical to Use

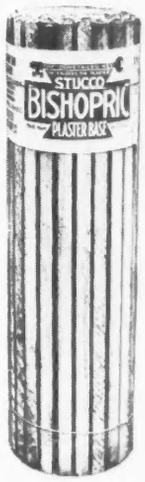
Both in first cost and in the cost of labor for applying Bishopric Base is decidedly economical. As already pointed out it takes the place of building paper, insulating material and sheathing, or lath, and is easily and quickly nailed in place since it comes in long rolls, giving the maximum of coverage with a minimum amount of labor. There is no waste.

Stronger than Lumber Sheathing

Bishopric Base has been frequently tested for strength in comparison with lumber sheathing - - at Yale University by Professor Shepard, at New York City, Chicago, Milwaukee, Indianapolis, Louisville, and Memphis, by municipal officials, and elsewhere - - and always with the same results; it is stronger, from 2 to 4 times stronger, than well constructed lumber sheathing. We will be glad to send you detailed reports of these tests on request.

Bishopric Inter-locking Base is Elastic

Owing to the manner in which it is constructed Bishopric Base, while bracing the frame of the building to which it is applied is yet sufficiently elastic to take up foundation settlements and shrinkage of lumber in the frame of the building, thus relieving the stucco of these strains and preventing cracking. The spaces between the wood bars are accurately spaced to provide the proper key for the stucco and to insure a base coat of the right thickness. The fibre board and asphalt mastic provide insulation and damp-proofing and Bishopric Base possesses also sound-deadening qualities to a high degree.



BISHOPRIC INTER-LOCKING BASE is shipped in rolls like this 100 square feet to the roll.

Bishopric Inter-locking Plaster Base

This is similar in construction to Bishopric Stucco Base but is designed for use on inside walls instead of exterior walls. It has all of the desirable qualities of Bishopric Stucco Base and effects a decided saving in the amount of plaster used as compared with wood lath, metal lath or hollow tile. The following figures, based on reports of leading plaster manufacturers tell the story.

Number of pounds of wood fibre plaster required to cover 100 square yards of wall surface:

On wood lath - - 1400 to 1700 lbs.
On metal lath - - 1800 to 2000 lbs.
On hollow tile - - 2200 to 2700 lbs.
On Bishopric Base 1050 to 1275 lbs.

BISHOPRIC BASE

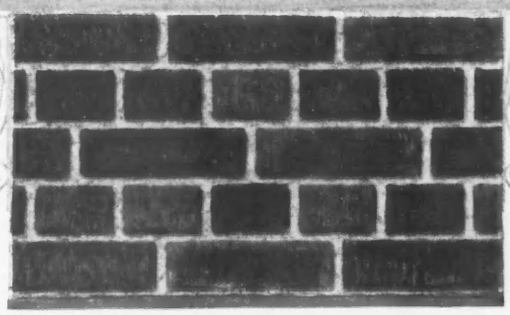
The insulating REINFORCEMENT
FOR EVERY STUCCO OR PLASTER WALL

For further details and literature write to: THE BISHOPRIC MANUFACTURING CO., Cincinnati, Ohio

Natures Permanent Mineral Colors

Made Since 1887





THE enhancement of the beauty of brickwork through the use of Mortar Colors is becoming more widely recognized every year.

Clinton Mortar Colors have played a prominent part in establishing this recognition, having been the standard since 1887.

Color samples and complete information regarding the ten Clinton shades gladly furnished upon request

Clinton Metallic Paint Company 50 Clinton Road Clinton, N. Y.

Clinton Mortar Colors

CLINTON METALLIC PAINT COMPANY CLINTON N. Y.



This Wonderful Roof Becomes More Popular Every Day!

NELSON Master Slab Roofs have been developed to meet successfully the many sided requirements of the perfect roofing material. Here is color in Nature's own wondrous beauty—a crushed rock surface with colors of **permanence.** A variety of colors to meet every taste. Shipped either blend-packed—or one color to the bundle.

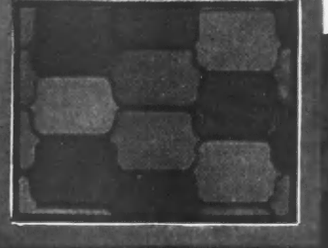
Think of a roof that lasts as long as the house and retains its beauty of color indefinitely. Master Slab Roofs do. Wind can't get under them. The edges never curl. Two, three and four thicknesses make them water-tight. And this roof is highly fire-resistant.

Nelson Master Slab Roofs are nationally advertised and known in every community. You can recommend them with the assurance of complete satisfaction to your client. Send for free booklet of beautiful color reproductions.

THE B. F. NELSON MFG. CO., Dept. C
Minneapolis, Minn.

Makers of over 200 varieties of roofing and insulation materials

NELSON MASTER SLAB ROOFS



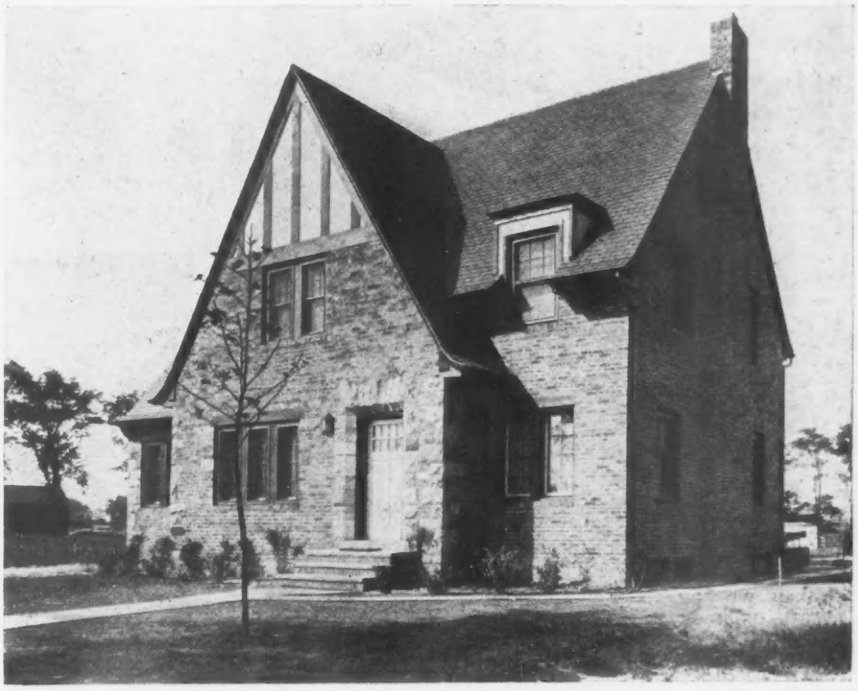
© The B. F. N. Mfg. Co., 1926

New Brick Walls Proving Successful

By W. CARVER, Architect

INVENTIVENESS and progress are two words which the modern builder is rapidly coming to associate with the brick industry. Up to a few years ago it was the average builder's opinion, and that opinion was largely true, that substitutes for brickwork had shown the greatest ingenuity and aggressiveness in promoting their products while the brick business had practically been standing still as far as promotional work was concerned. With the formation of the brick associations this condition rapidly changed and in the field of common brick especially there is no other building material now being produced and promoted which can show a better progress than has been made in the last seven years in new developments as to methods of use.

During the last seven years no fewer than four types of brick walls have been developed independently by the Common Brick Manufacturers' Association. Each one of these new walls being designed to cut the cost of brickwork and to provide the public with better construction.



Where Hollow Brick Walls Are Used to Good Effect. Below grade the basement has 12-inch all-rolok walls while the first and second stories and gable ends have 8-inch rolok-bak walls.

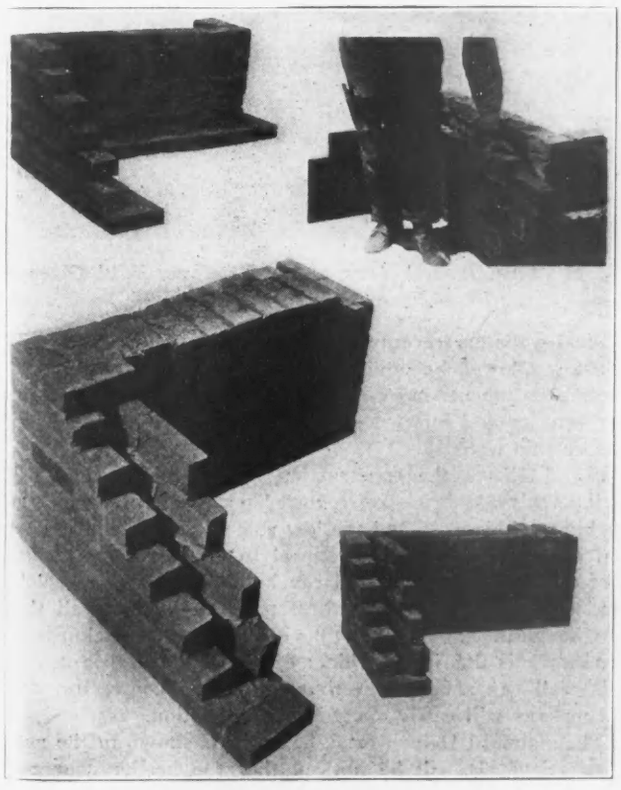


Fig. 1. The 8-Inch Rolok-Bak Wall. This is lowest cost type of hollow brick wall. It has the appearance of solid brick.

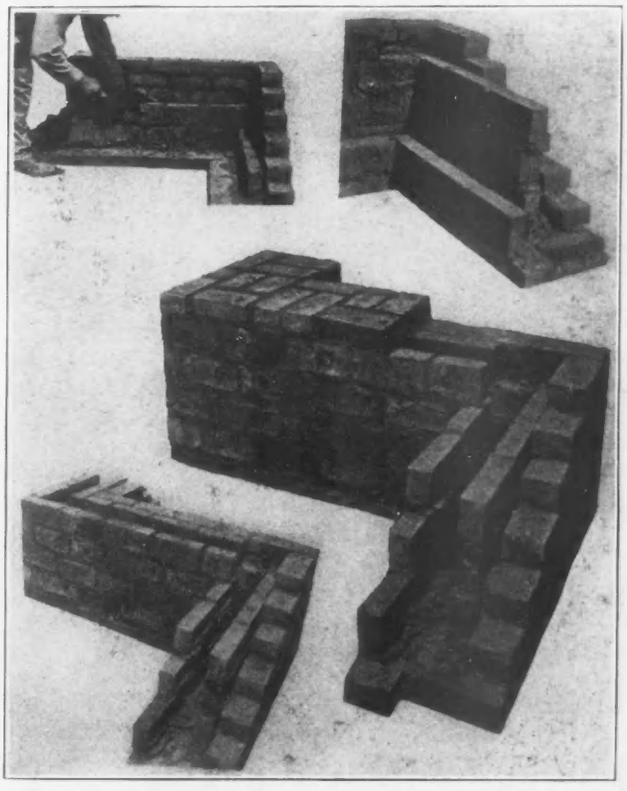


Fig. 2. The 12-Inch Standard Rolok-Bak Wall. The outer brick are laid flat and the back-up is of brick laid on edge.

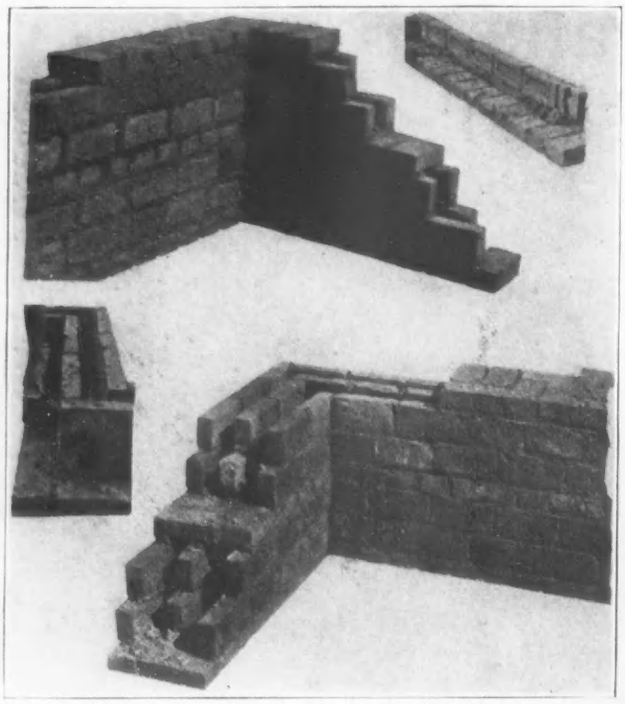


Fig. 3. The All-Rolok Wall Is Constructed with Two Courses of Brick on Edge Followed by a Flat Header Course. It is useful for stucco finish and for interior walls.

When we say these walls are new, we are speaking parenthetically only, because brick is a material that has been used since the dawn of civilization. Craftsmen, master craftsmen, engineers and architects of all lands have been familiar with brick construction and there is no doubt that at some periods of the world's history all of these new walls, and perhaps others, must have been devised and used. We know definitely that the ideal all-rolok wall, for instance, is a very old type of construction although, as stated before, it was developed independently by this association; but examples of its use have been found in England and China, Germany, Sweden and other countries and after the economy wall had been also independently developed by the association it was found that there were examples of even that construction on this continent. In every case, however, where old examples have been found, they have given entire satisfaction.

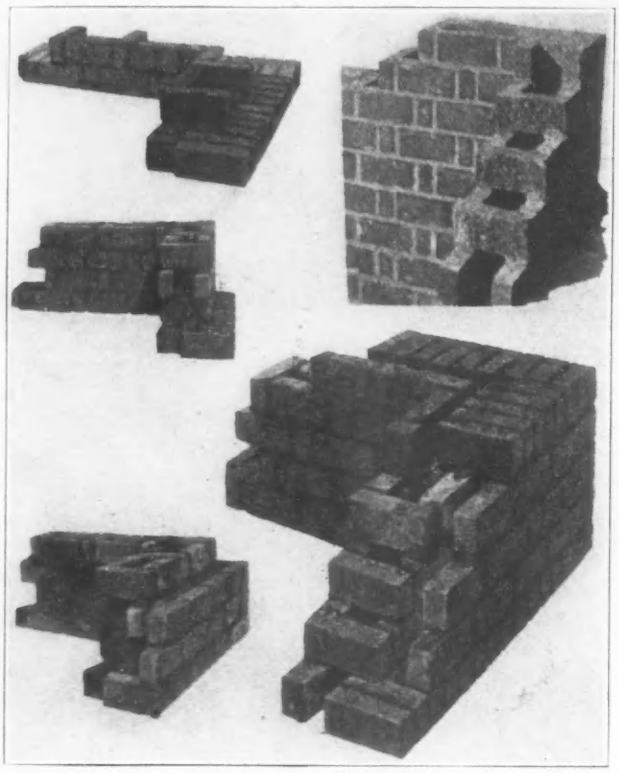


Fig. 4. The 8-Inch and 12-Inch All-Rolok Wall in Flemish Bond Presents a Distinctive Appearance.

Three of the four types of walls before referred to are all classified under the general term of the "ideal wall." These three types are:

(1) The rolok-bak wall.
(2) The all-rolok wall.
(3) The all-rolok wall in Flemish bond.

All of these walls are here illustrated and the cuts will convey much more information to the mason than a full and lengthy description of each type.

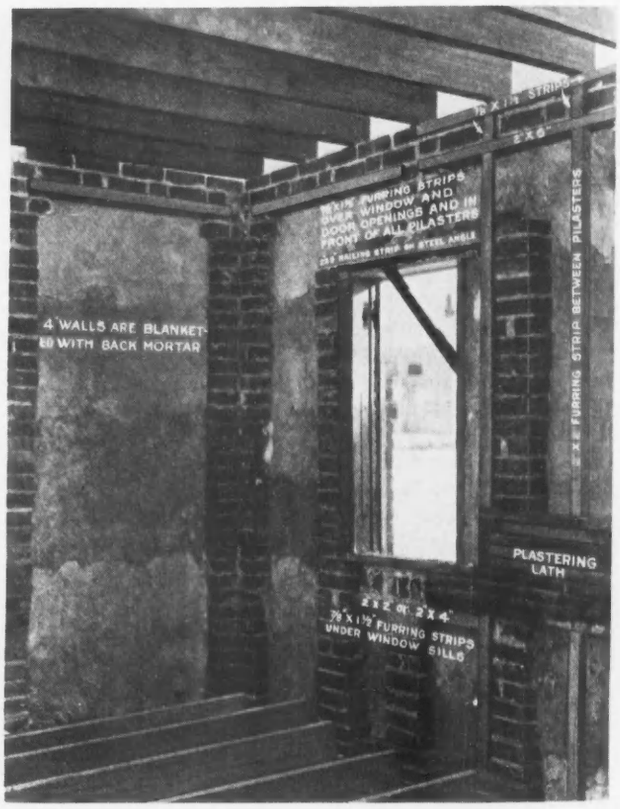
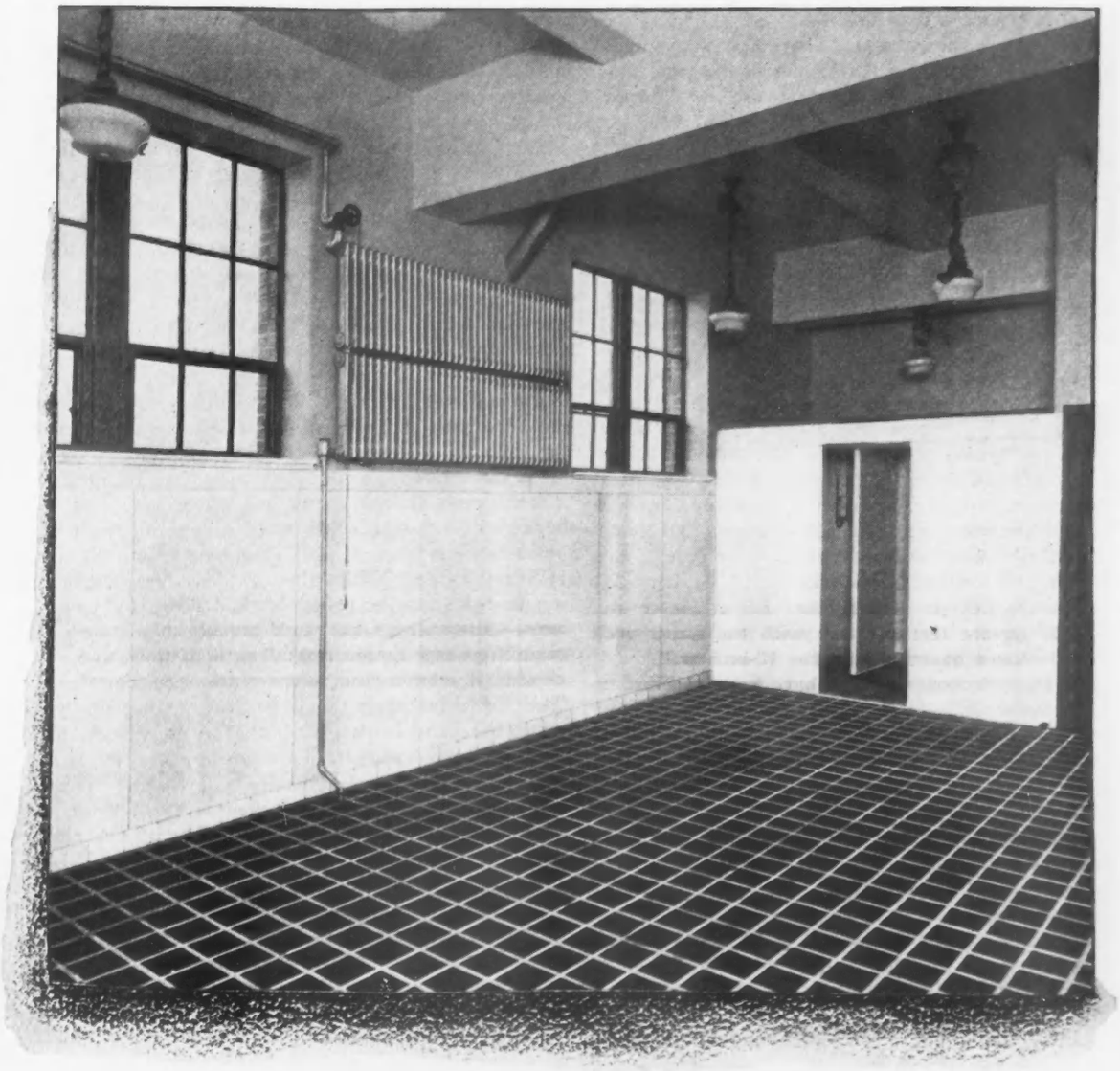


Fig. 5. This General View of the Economy Wall Gives a Very Good Idea of Its Construction.

Ideal walls are recommended wherever hollow unit walls are now allowed by building codes or by local custom, including basement wall construction, bearing and non-bearing exterior and interior walls and partitions, isolated piers and curtain walls.

Fig. 1 shows the construction of the 8-inch rolok-bak wall. Only 3½ brick are required per square foot for the backing of this wall, and the low cost of this backing material should make a strong appeal to any builder who has formed the habit of using large hollow units. The rolok-bak wall is one of the sturdiest types of hollow wall that can be built. The thinnest "withe" or solid thickness of brickwork is 2¼ inches thick; 85.7 square feet per day of this wall can safely be estimated by the contractor, and his masons will easily exceed this production.

The standard 12-inch rolok-bak wall is shown in the next illustration. It will be noticed that the header course is laid in so-called "basket weave" fashion. The outside 4-inch thickness is first built, followed by the construction of the two inner withes. Six courses laid flat equal four



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course of brick on edge; 8.4 brick are required per square foot for the backing and the contractor can safely figure a production of 72.7 square feet per day on this wall, and the mason will easily lay more than this.

The all-rolok wall is shown next. There are two courses of brick on edge followed by a flat header course, and this wall will consequently find its greatest use in exterior walls where a stucco finish is particularly desired, also for interior bearing and non-bearing partitions. The 8-inch thickness of this wall requires nine brick per square foot and 13¼ brick for the 12-inch thickness. The contractor in this case can safely figure on a production of 111 square feet per day per mason for the 8-inch wall, and with the 12-inch wall 118½ square feet per day per mason.

With the two types of wall just described and illustrated, the brick are laid in much the same way that brick are laid in common bond, and every mason knows that the common bond is the fastest type of brickwork he can lay.

The other type of wall next described—the ideal all-rolok wall in Flemish bond—is necessarily a little slower to place than the other two types, for the reason that ordinary brickwork in Flemish bond is also a little slower. It produces a distinctive effect, however, and this is probably the best known type of the ideal wall on this account, and some builders have a mistaken idea that it is the only type of the ideal wall. The illustration clearly shows its construction. It requires nine brick per square foot and a mason can easily lay 72.2 square feet per day with the 8-inch wall and almost the same quantity with the 12-inch wall.

Building codes the country over have been modified to allow wall construction. The considerable savings that it affords are being taken advantage of by many builders. For example, Henry A. Monnier, contractor, of Detroit, who has built several store buildings for the Kroger Grocery & Baking Company, says: "As a mason and general contractor I became interested in the ideal wall some months ago and have since used it very extensively in my building operations. I am highly pleased with it and find that all you have claimed for it has been absolutely borne out by my personal experience.

"For basement work I find it to be as economical as cement block and very decidedly superior to them.

"In walls above the ground I have found it very economical and have been able to erect these walls of common brick at a considerable saving over the cost of construction of hollow tile backup with brick facing. I am able to save approximately 12 per cent in all brick ideal wall construction over and above that of brick and tile construction and I find it decidedly better and my clients are highly pleased with it. In my opinion ideal wall common brick construction has a wonderful future."

The economy wall is the fourth and most recent type of wall construction developed by this association and is intended for use in the smaller type of residences. It is a 4-inch wall strengthened at intervals by pilasters and with corbelling at the floor lines to support the joists. It thus differs from brick veneer construction which is not essentially masonry construction, because in a veneered building the bearing walls are constructed of frame and the brick is merely tied on as an outside finish. A complete description of this wall has previously been published in the AMERICAN BUILDER.

Brick Making an Important Industry

THAT the brick industry is one of the basic industries of the nation is a fact that is not quite appreciated by many well-informed members of the building public. In 1925 the approximately ten billion building brick produced in the United States required for its manufacture thirty million cubic yards of clay and shale, which was excavated or mined. This is equal to a column of clay covering an acre and just a little short of two and a half miles high. The coal or its equivalent required to burn this enormous mass of clay was approximately three million tons, regardless of the enormous tonnage required for the power and dryer equipment and for the steam shovels.

There is considerably more capital invested in the brick industry than there is in the cement industry, notwithstanding the wonderful growth of the latter during the past fifty years.

The inventiveness of the age has brought changes into the production of building materials as into the production of all other commodities. The age-old yet always up-to-date brick industry is an interesting example. Brick is the most ancient of building materials. It always has been used because of its permanence, beauty and low cost.

The modern brick of today is made of exactly the same material—clay—as of old, but the slaves of bygone days who laboriously dug and carried out the clay, kneading it with their bare feet and molding it into bricks by hand, leaving sometimes their finger prints upon them, would not recognize as their successors the huge steam shovels, the ponderous pug mills, and the marvelously efficient brick machines that are now doing their work, and doing it much more thoroughly and at lower cost. And the brick burners of old, who constructed rough and ready kilns and burned them hit and miss fashion, would be fascinated to see the great brick kilns of today, constructed according to the scientific principles laid down by ceramic engineers—kilns where an exact predetermined heat is maintained for exactly the right length of time, and constantly checked by automatic temperature recording instruments. The brick industry today is thus a thoroughly modern institution, and brick is still the lowest cost manufactured material on the market. One can buy a cigar for ten cents, which will furnish pleasure for a few short minutes. For the same money, however, seven or eight brick, weighing about forty pounds, are delivered right to the place where they are to be used. And if laid so that people can see them they will delight the eye of successive generations and will afford them shelter in the completed wall for a thousand years.

Economists say that the making and using of brick is the most striking example of the way in which a local community enriches itself. The clay is dug at the city's back door and transformed into an everlasting building material and into buildings which add to the city's permanent wealth. And the money for doing all this stays right at home, to be spent again in the clay itself. An interesting romance could be written as to how the brick manufacturer turns worthless clay into the permanent wealth of the community.

It is remarkable how long well burned clay endures. It is about the most permanent substance in this changeable world. There are still in existence the hoary old burned clay relics of those dim recesses of the past in which are dimly seen the earliest beginnings of history. Bricks have been made and used for ten thousand years, and the bricks and pottery dug from prehistoric remains often form the sole link on which we can base our ideas of how those ancient people lived. The brick stairway which the feet of Abraham trod is still in existence and has recently been laid bare in the city of Ur of the Chaldees, laid waste about two thousand years ago. And these brick are just as good and sound today as when they came from the Babylonian kilns.

Made in a primitive way and burned in kilns that would be the despair of modern brickmakers, those ancient brick have proved practically indestructible. As to how much longer modern brick made under superior modern methods of scientific precision will last, the coming ages alone will tell. From all indications, however, it seems safe to say that brick are as permanent as the hills from which the clay is dug.



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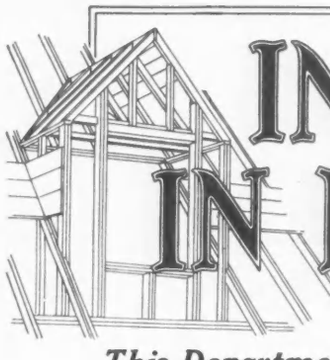
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INSTRUCTIONS IN ROOF FRAMING

This Department Appears Every Month in American Builder—Editor

Square Root in Roof Framing

By JOHN T. NEUFELD

THERE are four general methods for finding the lengths of rafters. These are:

1. Measuring across the square.
2. Stepping off with the square.
3. Calculating the length using square root.
4. The length per foot run method.

The first two methods have been discussed and illustrated in the preceding articles. In this lesson we take up the square root method; and the fourth method will be taken up in the following lesson. There is no one method that will be the best for all work. The best man will learn to use them all and use them as they suit the occasion. One method may be used as a check on lengths found by another method. Again one method may be more practical in one case than the other. Some methods require the use of the steel square while others do not.

Regardless of the methods we use, we should know the principle involved and be thoroughly familiar with the mathematical explanation of the method used. The square root method is avoided by many because of the difficulty encountered in extracting the square root. A little review on this subject (perhaps from one of the old textbooks that we have been using) will help us to master square root; and after once understood, it will be easy afterwards.

The illustrations on page 414 serve to show how square foot helps us in finding the lengths of different rafters. We may use this method for all cases in roof framing regardless of the pitch or shape of the roof. The following problems are based on the roof in Fig. 1 and should be solved by using square root.

Problems

1. If the "rise per foot run" in 6 inches, what is the "length per foot run"? Use square root.

2. The dormer rafters on this roof have a 10-foot run. What is the length if the rise is 3 feet? Use square root.

3. The one rafter on this roof has a 16-foot run, the other a 11-foot run. If they both have a one-third pitch, what is the total rise of each?

4. How much lower is the seat of the one than the other?

5. Find the length of each of the two rafters by the square root method.

Answers

1. If the "rise per foot run" is 6 inches, then the "length per foot run" is equal to the $\sqrt{12^2+6^2}=\sqrt{144+36}=\sqrt{180}=13.42$ inches.

2. If the "run" is 10 feet and the "rise" is 3 feet, the "length" of the rafter is $\sqrt{10^2+3^2}=\sqrt{100+9}=\sqrt{109}=$ 10.44 feet = 10 feet $5\frac{9}{32}$ inches.

3. If the pitch is one-third the "rise per foot run" is 8 inches. The rafter having a 11-foot "run" has a total "rise" of 11×8 inches = 88 inches = 7 feet 4 inches. The rafter having a 16-foot "run" has a total "rise" of 16×8 inches = 128 inches = 10 feet 8 inches.

4. The seat of the one rafter is 10 feet 8 inches less 7 feet 4 inches = 3 feet 4 inches lower than the seat of the other.

5. The "length" of the longest rafter is $\sqrt{16^2+10.67^2}=\sqrt{256+113.85}=369.85=19.23$ feet = 19 feet $2\frac{25}{32}$ inches.

6. The "length" of the shortest rafter is $\sqrt{11^2+7\,33^2}=\sqrt{121+53.74}=\sqrt{174.74}=13.219$ feet = 13 feet $2\frac{5}{8}$ inches.

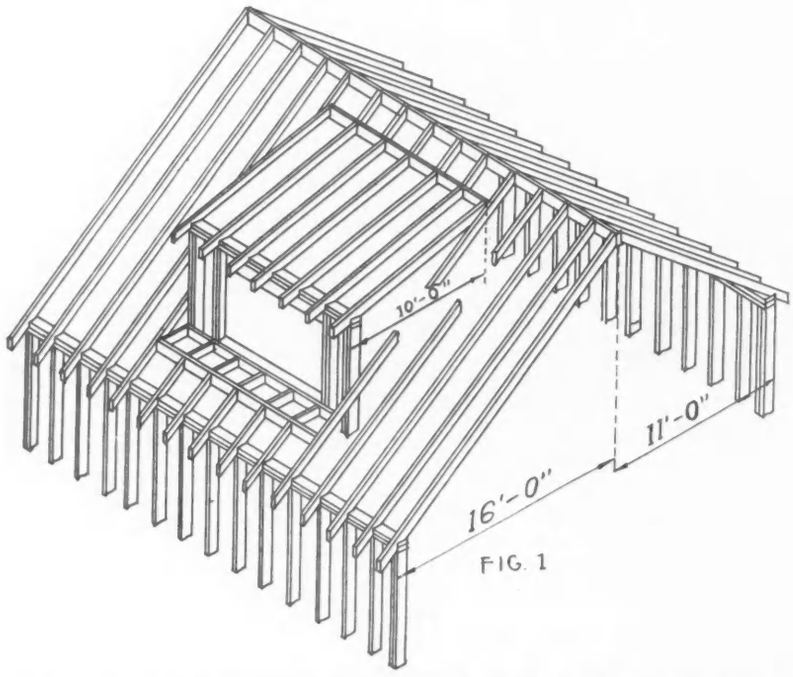
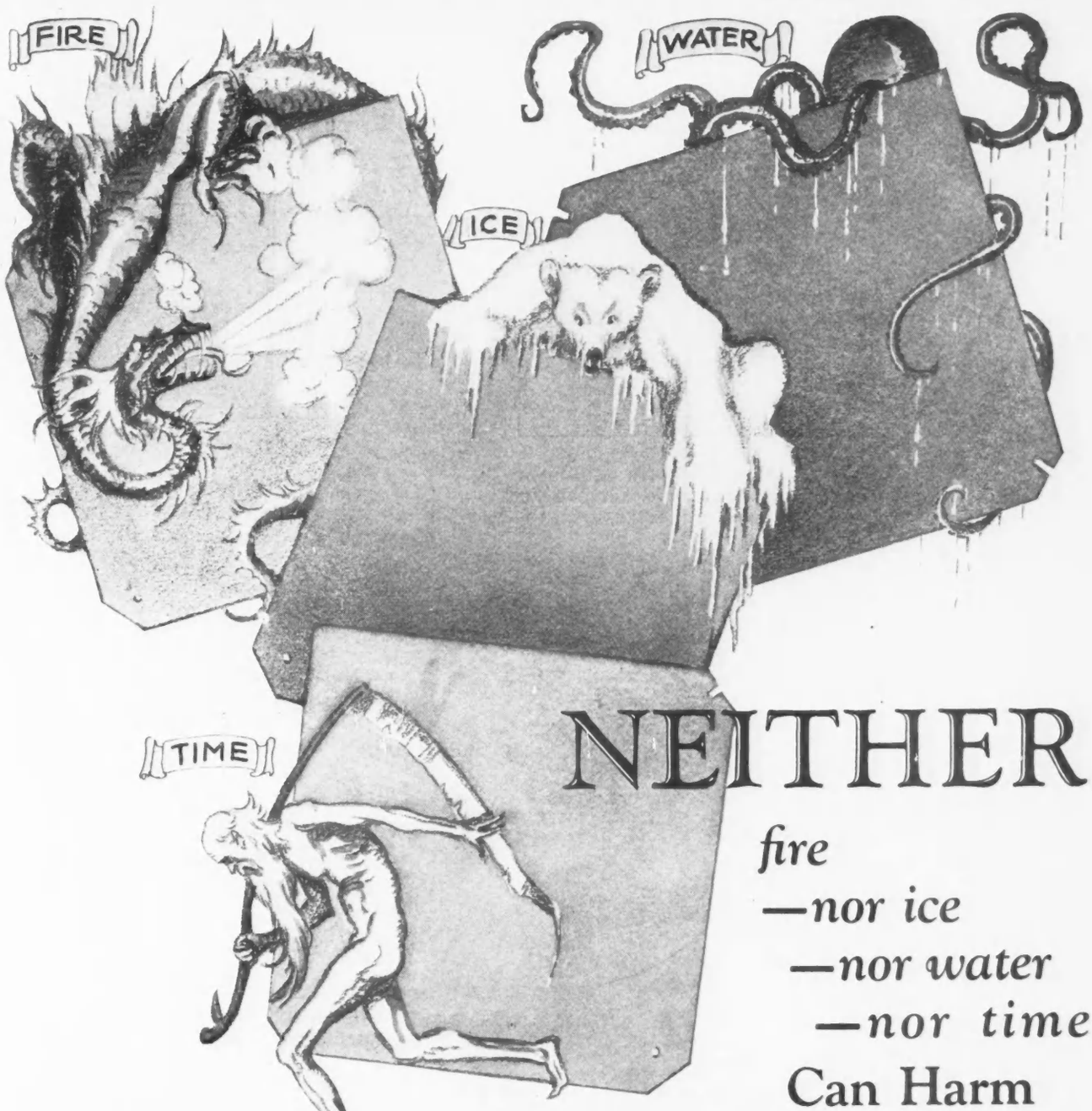


Fig. 1. The Problems Given on This Page Are Based on the Roof Shown in This Sketch. They are to be solved by the square root method. See also diagrams on page 414.



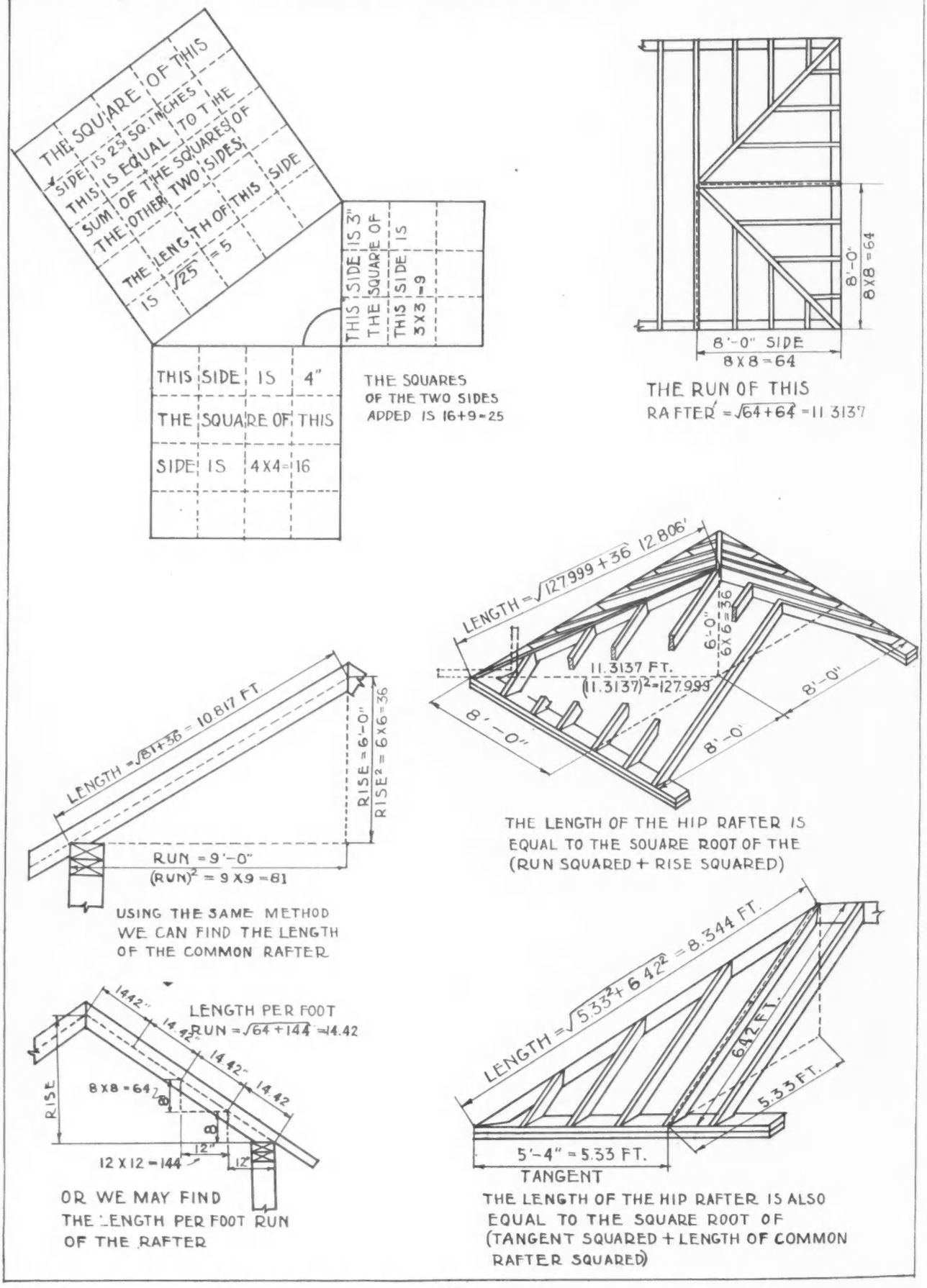
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On Page 412 the Method of Calculating Rafter Lengths by Means of Square Root Is Discussed and Above Are Shown a Group of Drawings Which Illustrate the Application of the Method to the Actual Work of Roof Framing as Well as the Basic Rule for Finding the Length of the Hypotenuse of a Right Triangle by Means of Square Root.

Many Contractors Are Getting Live Prospects Through This National Association

Free Listing Puts Them in Touch with Those Who Want to Build



The Hiawatha.

Tonight, in every locality, men and women will be sitting down in the lamplight to plan the homes they are about to build. No one in their town will know that they are live prospects in the home building market. Yet they are the very prospects their local contractors would almost give their right arms to reach.

Strangely enough, men in far distant cities are often the first to know of the plans of these prospective home owners. For nation-wide advertising campaigns, such as that of the Common Brick Manufacturers' Association, draw a constant flood of inquiries from these people who want to build.

This Association has made arrangements whereby the local contractor can learn who these building prospects are, in his own town, and can get in touch with them. This marks an advanced step in co-operation between contractor and national association.

No charge is made for listing the contractor in this "Builders' Register" of the Common Brick Association. The Register is regarded as the necessary completion of the other services which logically lead up to it. Every contractor or architect-builder who is familiar with brick masonry, or who wants to become familiar with it, should write the Association at once and ask to be placed on this Builders' Register.

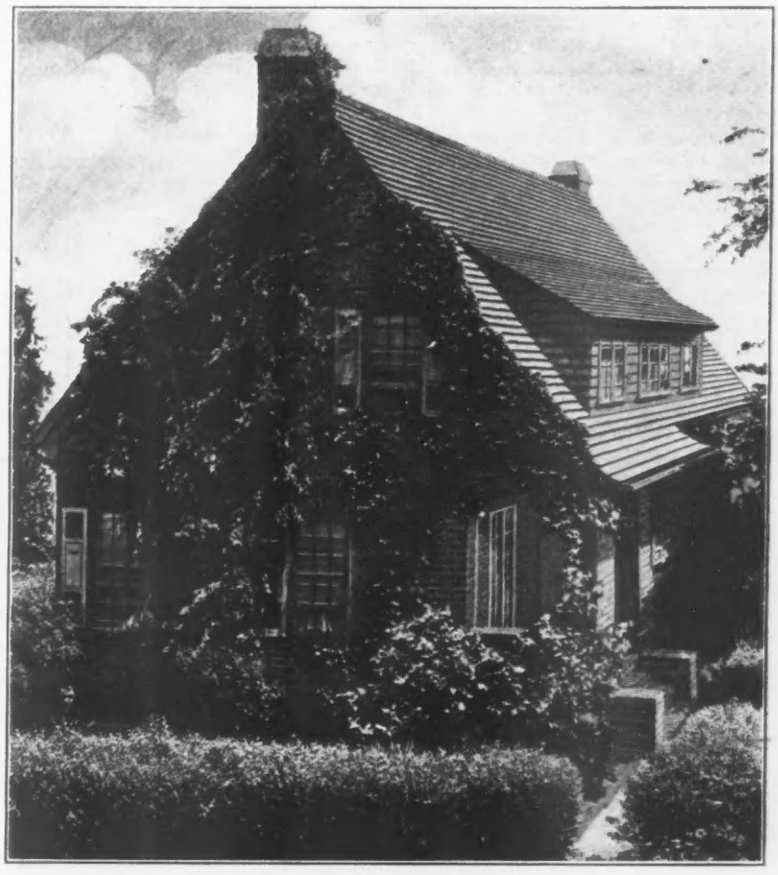
Plan Books and Plan Service

Advertising in such national maganzines as the Saturday Evening Post, House Beautiful, and Better Homes & Gardens, draws thousands of inquiries asking for the plan books issued by the Association, and requesting the names of local contractors who can build with brick.

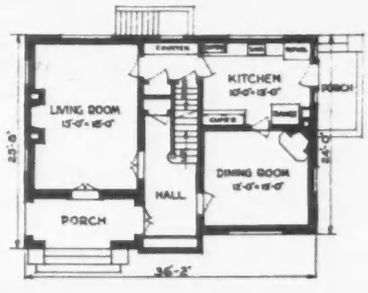
The plan books sent to these prospects contain 134 brick house photos and floor plans. Specifications and complete working blueprints for each of these houses are furnished by the Association—so that the contractor can readily be prepared to build any one of them without delay or inconvenience.

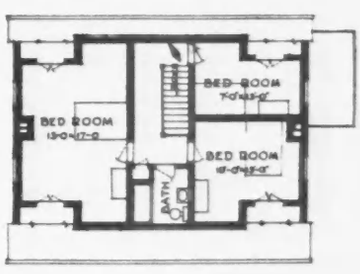
The house shown here is the "Mineola," one of those shown in the plan books. It was designed by one of the country's foremost residential architects—the same architect who designed the popular "Hiawatha"—hundreds of which have been built in all parts of the country. Plans for these houses are distributed exclusively through the Common Brick Manufacturers' Association.

New brickwork effect and low cost hollow walls have also been contributed to the industry by the Association. The completeness and ready availability of this national service is one important reason for the growing popularity of common brick in residence construction. The Common Brick Manufacturers' Association, 2131 Guarantee Title Bldg., Cleveland, O., will be glad to answer any request for the complete details of this service.



The Mineola.





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How We Help You Get Live Prospects

The Common Brick Manufacturers' Association of America conducts a national advertising campaign, directed to prospective home builders. By every mail there comes a flood of inquiries from every city, town, and hamlet in the country—from **your** locality, Mr. Builder.

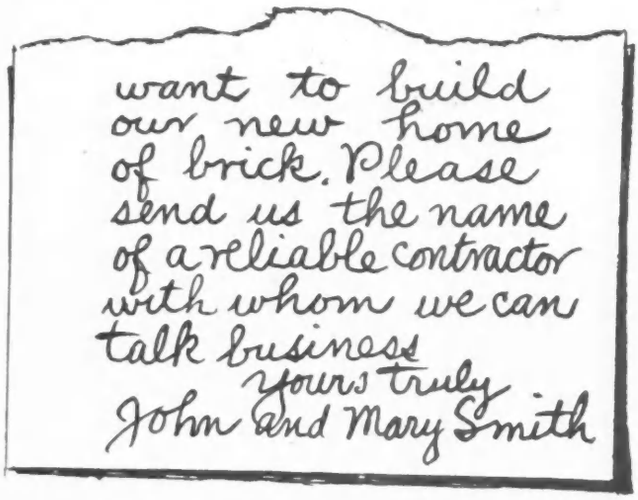
These inquiries are from "red hot" prospects—from people intending to build who may not have previously mentioned the fact to anyone else. Many of these people ask for the names of reliable contractors or builders, familiar with brick construction and brick costs, who will give a competent bid.

Unfortunately there are some builders, not familiar with brick costs, who quote an off-hand figure for a brick building anywhere from 15% to 25% and even higher than for a building of less substantial construction. The builder who knows realizes that such figures are entirely out of line—that the cost of the basement, the chimneys and fireplaces and the entire inside construction and finish is exactly the same in any case, and that **the real difference in cost is the difference in the cost of the exterior walls above the first floor line only.** This difference varies from 6% to 8% on the total cost of the house, according to the locality.

The day of the brick house is here now. People are realizing as never before, that the brick house is the best house and saves them money. In ever increasing numbers prospective builders desire brick homes, and regardless of your previous practice in building, we urge you to work out for yourself, at your own local material costs and wage schedules, the exact up-to-date square foot cost of brick construction in your own neighborhood. The coupon will bring helpful books containing newest information which will help you do this.

No Charge for This Registration

If you are a responsible brick contractor, a responsible general contractor or builder familiar with brick costs, a repsonsible general contractor or builder without much or any experience with brick costs but willing to get right down to cases and figure accurate comparative costs—we invite you to apply for free listing in our Builders' Register. Please send us sufficient information so that we can confidently recommend you to prospective builders in your territory. This information can be sent direct to our main office, to our district office nearest you, or through any brick manufacturer who is a member of this Association. Tell us how many brick homes you built in 1925.



Is Your Name on Our Builders' Register?

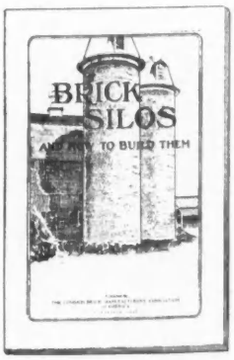
Our Plan Service Helps You Close the Deal

Pictured in our plan books are one hundred and thirty-four attractive designs for all types of homes. We furnish specifications and complete original working blueprints for all of these.



Plan Books and Working Drawings at Nominal Cost.

The four books in which these designs are illustrated, in photograph and floor plan, are the most popular plan books ever issued. Over half a million people have bought these books. To have attained such striking and outstanding popularity these designs must be the kind that you would like to show your clients.

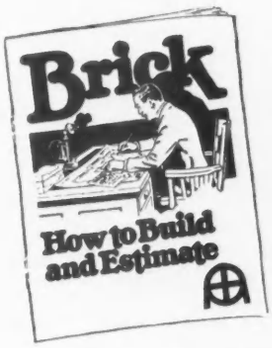


And no longer does it pay the builder to work far into the night to make his own working drawings. We spare the builder all that disagreeable labor. Most of our working drawings are nominally priced at $10 per set. Only in cases where a royalty is paid to architects does the price range higher. And not only do these blueprints save labor for the builder, but there is the additional advantage that the dimensions and proportions are exactly the same as pictured in the completed houses. All the drawings are made by competent architects, and in some instances by the most famous and highest priced residential architects in America.
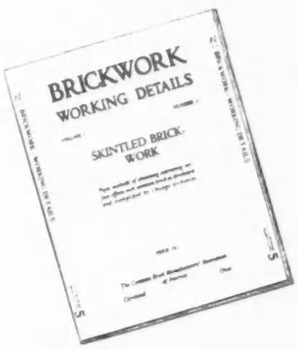
BRICK SERVICE

This Brick Manual Gives Full Information

How many brick does that house require? How much sand, lime and cement for the mortar? How many hours bricklayers' time? How many hours laborers' time? What equipment do I need to start building a brick house? What bond and section of mortar joint is economical yet effective? What principles should be followed in selecting mortar color? These questions, and many others which will occur to the builder are answered in this manual of brick construction—"BRICK, HOW TO BUILD AND ESTIMATE." Builders and contractors by the hundred have written to thank us for making this information available to them. It is one of the most important links in our chain of service to the builder. Bricklayer apprentice schools and the most famous universities have asked us for copies of this 72-page book for classes in architecture. (See coupon.)



Beautiful Effects with Low Cost Common Brick



Some of the most beautiful effects obtainable in brickwork are accomplished by the use of common brick properly laid.

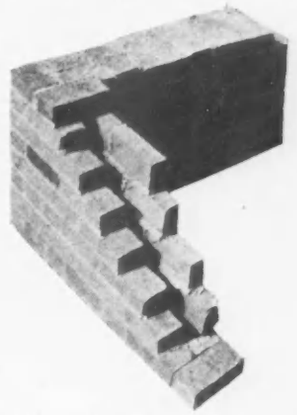
Architectural genius has now devised entirely new effects with this incomparable material. Let us show you details of how some of the most prominent of the nation's architects are using common brick in these new and striking ways in the finest residential architecture.

You Should Know About These New Low Cost Walls

Brick construction, laid in hollow walls, costs less than construction of hollow units or any other substitute material.

Some builders do not yet realize that there has been greater development in brick construction during the past five years than in any other type of material, and that by using brick in these new yet simple ways money can be





saved in any type of building. Up-to-date builders everywhere are famarilizing themselves with these latest types of wall—less costly than hollow unit walls, but infinitely more fire-resistive, sturdier, and superior in every way.

The wall shown here, the nine-inch rolok-bak wall, is but one type of several. The outside four-inch thickness is laid on its flad bed, the backing on edge. It is obvious that the cost of the outside four-inch thickness is the same, regardless of the backing. Four brick are required per square foot for the backing. Figure the cost of these four brick by mental arithmetic. The saving in cost over any other type of backing will surprise you.

WHERE BRICK MEN ARE AT YOUR SERVICE

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Denver	1735 Stout St.
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Hartford, Conn.	226 Pearl St.
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Philadelphia	303 City Centre Bldg.
Portland, Ore.	906 Lewis Bldg.
Salt Lake City	301 Atlas Blk.
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Common Brick Manufacturers' Association,
2131 Guarantee Title Bldg.,
Cleveland, Ohio

Send me the brick books checked below, for which find money or stamps enclosed.

- ☐ "Your Next Home"—62 homes in picture and plan (10c).
- ☐ "The Home You Can Afford"—58 homes (10c).
- ☐ "Multiple Dwellings of Brick"—(10c).
- ☐ "Skintled Brickwork"—(15c).
- ☐ "Brick, How to Build and Estimate"—(25c).
- ☐ "Farm Homes of Brick"—(5c).
- ☐ "Brick Silos"—(10c).
- ☐ "Hollow Walls of Brick"—FREE.

Name .....

Address .....

Latest Styles In Siding

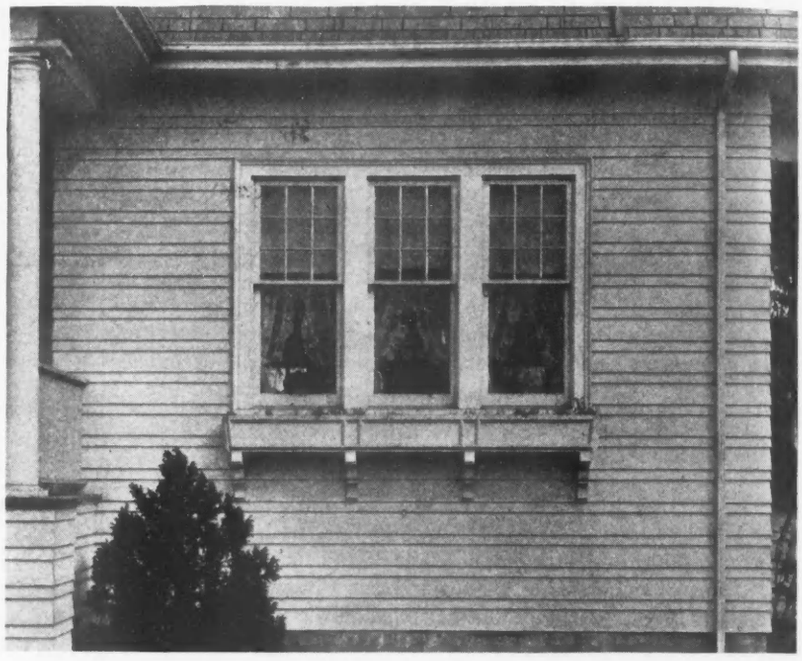
Strickingly Beautiful Effects Produced with Western Red Cedar Siding Laid with Various Exposures

WHEN the vast timber resources of the Pacific Northwest were tapped, one species in particular, the western red cedar, was discovered to be particularly adapted for roofs, sidewalls and other use where exceptional weather-resistance was desired. Early settlers in the region around Puget Sound found this wood had long been in use by the Indians for their canoes and totem poles.

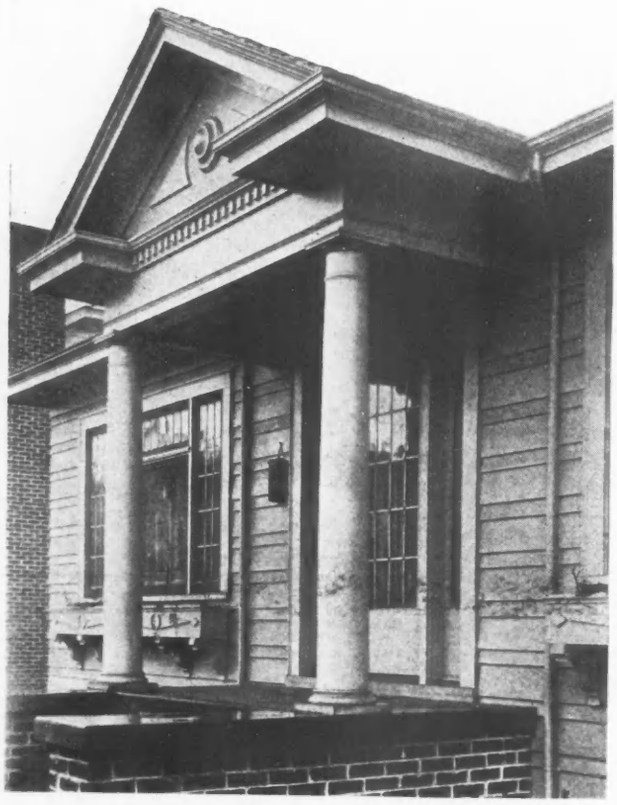
Light, soft, straight-grained and easy to work, it proved to be practically immune to decay, because of a natural preservative oil which it contains, and many of the houses erected in Washington and British Columbia during the "Covered Wagon" period are still standing and in good condition.

With the erection of mills and the shipment of Northwest lumber products to all parts of the country, the excellent qualities of this remarkable wood became widely known and today lumber and shingles of western red cedar are shipped to every part of the world.

Architects and builders have learned that it is especially valuable wherever it is necessary for wood to come in contact with dampness or earth, or where it is required to stay in place and resist deterioration for a long time when exposed to the weather.



There Is Today a Vogue of Combination Siding, Usually Various Patterns of Wide and Narrow Siding, Alternating, so that Some Striking Effects Are Produced.



In Addition to Its Use for Siding and Shingles Western Red Cedar Has Been Found Admirably Adapted to Exterior Trim of All Kinds.

Because of these qualities, it has proven well adapted for siding and its beautiful appearance and resistance to storm and temperature changes have led those who have used it to recommend it strongly for economy and endurance. Its insulating quality is remarkably high, so that it tends to keep the house which is sided with it warmer in winter and cooler in summer.

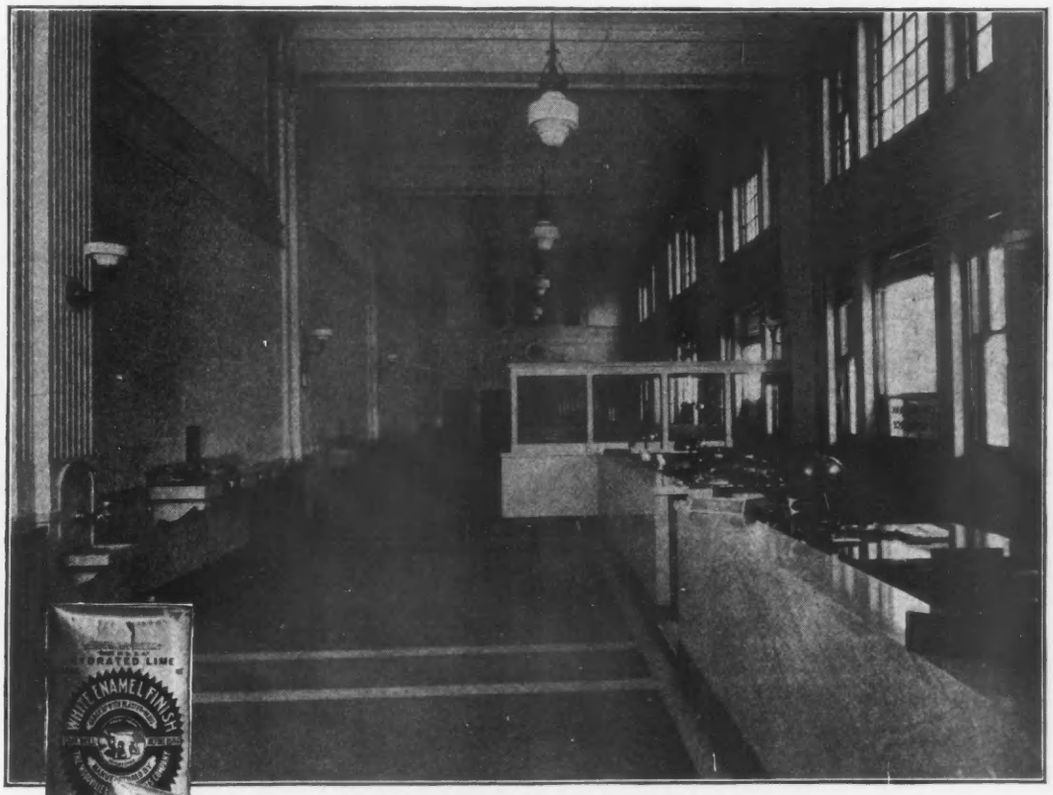
The modern trend toward wide variety in the exterior appearance of homes is well served by the various widths and styles in which cedar siding is manufactured. On the Pacific Coast, where these tendencies in architecture have been especially pronounced, there is a decided vogue of combination siding, usually various patterns of wide and narrow siding, alternately, so that some striking effects are produced.

Some of the treatments which have proven popular are alternate 4-inch and 8-inch widths; alternate 4-inch and 12-inch widths; 4-inch and 6-inch widths used singly; alternate 4-inch and 6-inch widths, and triple 4-inch with single 10-inch widths.

Western red cedar siding is made in the following sizes: ½ inch by 4, 5, 6, 8 and 10 inches and ¾ by 8, 10 and 12 inches. These are bevel sidings in which the ½-inch stock is ½ inch on the thick side and 5/32 inch on the thin edge. The ¾-inch material is ¾ inch on thick edge and 3/16 inch on thin edge. Finished widths are 3½, 4½, 5½, 7½, 9½ and 11½ inches. Standard lengths are multiples of 1 foot.

The use of the 8, 10 and 12-inch widths is quite common and excellent effects are achieved with them.

Home builders are realizing more keenly every year that a house should be built with an eye to the future and that the well-built house, attractive in appearance and giving promise of a long life will not only make a more satisfactory home but will command a better price when placed on the market than one not so well constructed.



National Bank of Commerce, Lincoln, Nebraska
A. Moorman & Co., St. Paul, Minn., Architects and Builders



"Quality from stone to finish"

Does it cost more?

A plastering contractor had always used a certain finishing lime due to its cost. Recently he had a dwelling on which it was more convenient to use one of our brands.

According to this contractor's experience, the job usually required 45 sacks. We told him much less would be sufficient. Finally we compromised on 40 sacks.

When the job was completed, 6 sacks were returned unused!

More than one architect and contractor has found that the extra and easier spreading qualities of our finishing lime has more than offset the slight extra cost if any.

In the long run, does our finishing lime actually cost more?

Give any one of our brands a trial and judge for yourself. Sold everywhere by building supply dealers.

THE WOODVILLE LIME PRODUCTS COMPANY
TOLEDO, OHIO

WHITE ENAMEL - GOLD MEDAL AND WHITE LILY FINISHING - HYDRATED - LIME

zinc—*The Permanent Metal*

Many qualities of Horse Head Zinc make it a desirable material for roofing, gutters and conductor pipes. The most important is its permanence.

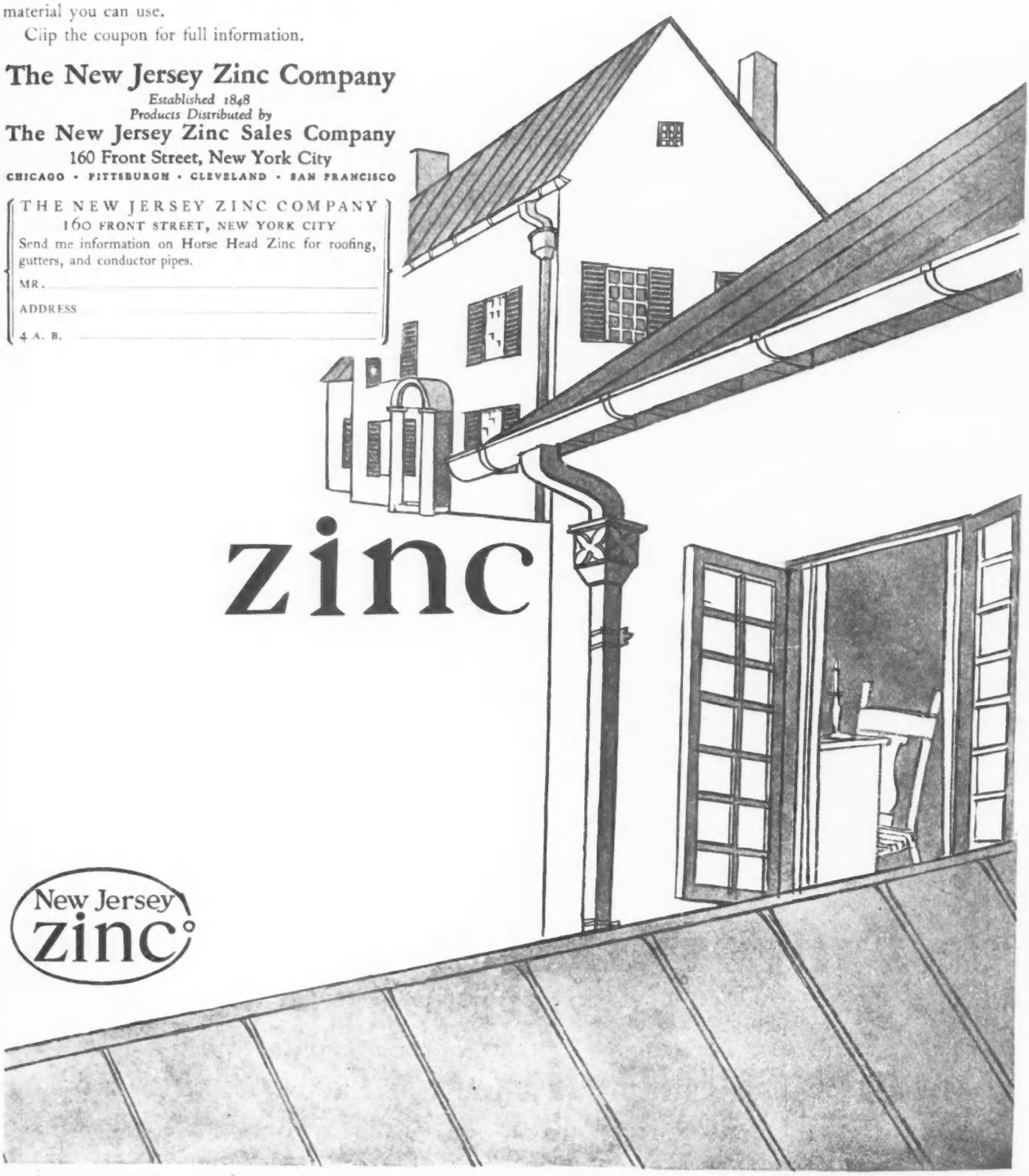
Compare the cost of installations of permanent Horse Head Zinc with that of temporary installations. Figure Zinc on the basis of first and only cost, and on value received. Figure on the increased value of a house Zinc-equipped.

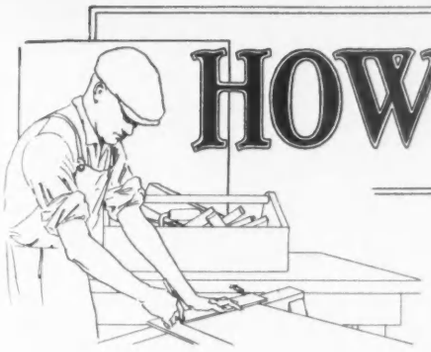
Horse Head Zinc is inexpensive. It is lower in cost than any other permanent metal roofing material. Over a period of years it is the most economical material you can use.

Clip the coupon for full information.

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HOW DAN DOES IT

A Department for Passing "Life Savers" along to other Builders

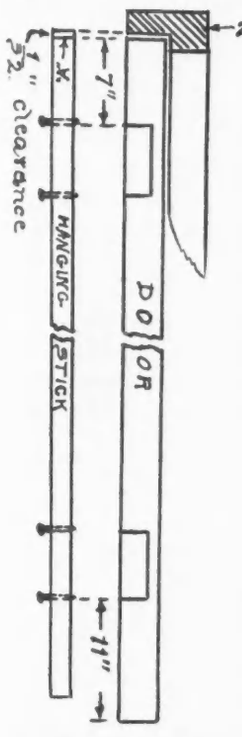
$ 2 for an Idea

Dan is an ingenious cuss. Nothing ever stumps him. He always knows the way out when he runs into a tough problem out on the job or in the office. Dan is going to edit this Department and will pay $2.00 each for every good idea he can use here to show and tell other builders "how to do it." Send him a rough sketch and a short description of what the tough job was and how you handled it.

Address Dan-Do-It, care of American Builder, 1827 Prairie Avenue, Chicago, Ill.

To Mark Door Hinges

WITHOUT attempting to give specific directions as to how a door should be put up, I will describe a method of accomplishing the work which I have found not only a time-saver but to insure accuracy in letting the hinges into both door and jamb.



A Quick and Accurate Method of Marking the Hinges on Door and Jamb.

To accomplish this, take a rod of suitable dimensions and mark on it the location of the hinges as desired and drive small brads through at these points, letting them project just enough to make a slight scratch when sharpened. Next make a mark on the upper end of the rod, down about ⅓ of an inch from the end, or the amount of clearance desired for the door at the top. The rod is then ready for use, as shown in the sketch.

To mark the location of the hinges on the door frame, place the top of the rod against the head jamb in the rabbet for the door and press it against the side jamb. The sharp joints of the brads will at once prick off the locations of the hinges. Lay the rod on the hinge edge of the door with the mark "A" flush with its top. Prick off the hinge locations in the same manner as on the jamb.

If the hinges are accurately let into the jamb and the door at the points marked, they will slip together easily and work perfectly free. By this method the hinges may be put onto both the jamb and door without setting the door into frame to mark the hinges, which saves considerable time and work. The stick can be used for all doors of a similar size throughout the building and kept for other jobs as well.—L. M. Hodge, Wilmington, Cal.

✣

Hints for Carpenters

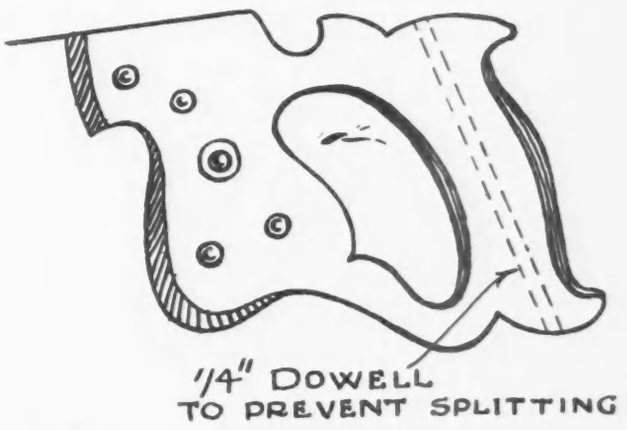
MANY carpenters neglect their most important tool, their saw, letting it get gummed up with pitch. I use neatsfoot oil, thinned out with kerosene. I always have an oil can handy and by applying it three or four times a day my saw is always kept bright and slick.

I also have cut a hole in the blade of my sliding rule, bevel square, centering at one inch. To use as a gauge to make any line parallel to any straight edge, I slide the rule out just one inch more from the face of the square than the width required, which places the hole in the square at the required distance. Then, by holding the square in one hand and the pencil in the other, the line can be quickly and accurately drawn.—John Williamson, Oakland, Cal.

✣

Some Useful Ideas

HERE are a few ideas which I hope will be useful to other carpenters as they have been to me. Most every carpenter has a lock on his tool box and some time or other has lost his key or left it at home. Generally you get two keys with a lock and if one of these is hidden under some piece of hardware on the box it is readily available in an emergency.



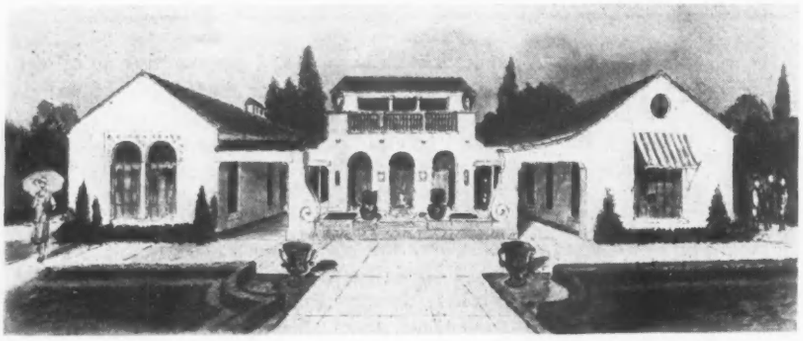
Carpenters Will Be Saved Many a Broken Saw Handle by Inserting a Dowel as Shown Here.

I have often broken saw handles on a job by letting them fall and I imagine others have had the same inconvenient experience to delay their work. I now bore a small hole through the handle of each saw, and run a dowel through this hole. With this protection the handle will not break when dropped. I have also saved myself bother by planing two sides of my screw driver flat, which prevents it rolling off a step ladder.—George W. Gilbert, Oakland, Cal.

NEWS of the FIELD

To Exhibit Complete Home

A FEATURE of the Homes Complete Exposition, to be held at Indianapolis, Ind., April 10 to 17, will be a completely furnished house which is being constructed in the center of the Exposition Building. This house, which is of the Mediterranean type of architecture, is being built by R. H. Shelhorn & Company and furnished by L. S. Ayres & Company. It is of one story, built in the form of a "U" shape around a patio garden, which is partially enclosed by a wall with gates at either side.



This Complete Home Will Be Exhibited in the Center of the Indianapolis Home Complete Exposition.

One wing of the house contains a bed room, bath, and study while the other provides for kitchen, breakfast room and dining room. A large living room forms the bottom of the "U" and the side next to the patio is screened by a cloistered walk, over the arches of which brightly colored awnings are used. The space above the living room will have a clever provision for the band which will entertain visitors to the exposition.

✣

New De Vilbiss Plant

MORE than $1,000,000 will be expended by the De Vilbiss Manufacturing Company, of Toledo, Ohio, this year on the enlargement of its plant and the beautification of its grounds. Work will begin this spring and more than a year will probably be required for the completion of the present plans. The principal new buildings will be directly east of and connected with the present factory buildings and will include a four-story office building with a display and banquet room, a three-story factory building and a general heat and power plant.

✣

Century Electric Company Expands

AN announcement has recently been made that the Century Electric Company, of St. Louis, Mo., has purchased an eight-acre factory site on a branch of the Wabash Railroad at Spring Street, Forest Park Boulevard and Manchester Avenue, on which it will erect buildings for manufacturing and warehouse purposes. The company does not plan to abandon any of its present factories, the new construction being entirely in the nature of increased facilities necessitated by the expansion of the business.

✣

Disston Opens Detroit Branch

A NEW Detroit branch is being opened by Henry Disston & Sons., Inc., of Philadelphia, manufacturers of saws, tools, files and steel. This branch, at 620 East Hancock Avenue, will consist of a complete warehouse, offices and all necessary equipment for giving prompt service to users of power saws and other mill goods equipment in this territory.

The steel sales will be in charge of Mr. Kenneth L. Clark, western representative for steel sales, whose headquarters in the past has been at the Disston branch in Chicago. The mill goods division will be under the direction of Mr. L. L. Mather.

✣

Guaranteed Radiator Loads

THE International Heater Company, Utica, N. Y., has announced a new policy of guaranteed radiation loads for all boilers, round, sectional and smokeless, manufactured by this company. This guarantee provides that these steam and water boilers shall maintain two pounds steam pressure, or 180 degrees temperature at the boiler on the guaranteed amount of direct cast iron radiation shown for each size. This guarantee is based on fuel of at least 11,500 B.t.u. and a chimney providing sufficient draft to properly burn the fuel.

✣

Allith-Prouty Sales Convention

THE national sales convention of the Allith-Prouty Company held at the home offices in Danville, Illinois, represented practically the entire sales organization. All salesmen were called in from the territory and several of the district representatives were present.

The primary purpose of the meeting was to secure a more complete and effective co-ordination of the efforts of the factory and groups that make up the sales organizations. Working models of Allith products had been prepared and typical installations were demonstrated and discussed by factory officials. Each salesman was given thorough instructions on improvements in the line and the entire convention was taken out to examine several jobs.



Salesmen and District Representatives of the Allith-Prouty Company at Recent National Sales Convention.



108 color combinations

in this guide to color harmony of roof, walls and trim

Choosing correct roof color is a matter of *seeing it in advance*. To select a pleasing combination, roof, walls and trim must be seen *together*.

The new Richardson Booklet and Harmonizer enables you to do this *in advance*.

The booklet illustrates Richardson Multicrome Roofs on many interesting homes of various architectural styles.

The Harmonizer enables you to see the effect of 108 different color combinations of roof, walls and trim.

These valuable guides to pleasing color harmonies are free to you. Send the coupon for your **copy**—now.



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Products:

Richardson Multicrome Roofs (built of Richardson Super-Giant Shingles); Lok-Top Asphalt Shingles; Viskalt Membrane Roofs; Rubbertex Real Roofings; Flex-a-tile Style-4 Slab Shingles; Individual Shingles; Smooth and Slate-Surfaced Roll Roofing; and a complete line of Viskalt Paints, Cements and Coatings.

The Roof in Color Harmony

The roof of any home should be in pleasing color harmony with the walls, trim and architectural style of the house. This is the modern note in home architecture—the thing that all home-builders are looking for today.

Realizing this, Richardson now offers you twelve distinctive roof colorings for your customers—many of them wholly new. How they adapt themselves to houses of various finishes is indicated on the chart below. How they give a home *complete* charm of perfect color harmony is illustrated on the reverse side of this page.

Richardson Multicrome Roofs offer a range and variety of rich color never before obtainable at moderate cost. In the panel below is given a complete list of the basic Richardson colors.

50% Thicker Than the Ordinary Roof

The Multicrome Roof is built of Richardson Super-Giant Shingles—extra large, extra heavy. Its 50% greater thickness adds years of endurance. Its base is sturdy, long-fibre Richardson felt. Its waterproofing is Viskalt—99.8% pure bitumen, especially vacuum-processed. Its surface is slate in close, overlapping flakes—further protection against weather and fire hazards.

This roof gives the maximum value at a moderate price. It is economical to lay and equally good for new or over-the-old-roof jobs.

The Multicrome Thatch

This new Richardson roof, with its blended tones of weathered brown and dull red suggests the mellow English downs in every curve. It is an easy roof to apply, too. No expensive cutting or trimming is necessary to secure the realistic thatch effect. It comes in convenient sections, ready to lay.

The Richardson Color Chart

The Nine Basic Richardson Colors

Weathered Brown
Antique Brown
Jade Green
Gray Green
Tile Red
Dull Red
Dusk Blue
Heather Purple
Black Pearl

Three Exclusive Blends

Opal—a beautiful mingling of weathered brown and gray green.

Bronze Mosaic—an unstudied mixture of weathered brown and old red.

Duotone Brown—a combination of two rich tones, antique brown and weathered brown.

HOUSE COLOR	TRIM COLOR: *White*	*Cream*	*Brown*	*Green*	*Blue*
White	◈	Opal * Onyx * Duotone Brown *	Weathered Brown Duotone Brown * Tapestry Tan * Bronze Mosaic *	Opal * Onyx * Jade Green	50% Opal 50% Dusk Blue 75% Dusk Blue 25% Black Pearl
Cream	Opal * Onyx * 50% Opal 50% Bronze Mosaic	◈	50% Duotone Brown 25% Opal 25% Heather Purple Duotone Brown *	Opal * Onyx * Jade Green	Weathered Brown Tapestry Tan * 50% Duotone Brown 50% Heather Purple
Brown	50% Duotone Brown 25% Opal 25% Heather Purple Duotone Brown *	50% DuotoneBrown 25% Opal 25% Heather Purple Tapestry Tan *	◈	◈	Weathered Brown Tapestry Tan * 50% Duotone Brown 50% Heather Purple
Gray	50% Opal 50% Dusk Blue 75% Dusk Blue 25% Black Pearl	50% Dull Red 50% Opal 50% Duotone Brown 50% Heather Purple	50% Duotone Brown 25% Opal 25% Heather Purple Opal *	50% Opal 50% Dusk Blue 50% Opal 50% Heather Purple	50% Opal 50% Dusk Blue 75% Dusk Blue 25% Black Pearl
Red Brick	Tapestry Tan * 50% Antique Brown 25% Dull Red 25% Heather Purple	50% Dull Red 25% Tile Red 25% Heather Purple Bronze Mosaic *	◈	Onyx * Opal * Tapestry Tan *	Onyx * Tapestry Tan * Opal *

*These roofs are formed of the following shingle combinations:

Opal	Bronze Mosaic	Duotone Brown	Tapestry Tan	Onyx
10% Weathered Brown 10% Gray Green 80% Opal	10% Weathered Brown 10% Dull Red 80% Bronze Mosaic	10% Weathered Brown 10% Antique Brown 80% Duotone Brown	50% Weathered Brown 25% Opal 25% Bronze Mosaic	50% Jade Green 25% Opal 25% Bronze Mosaic

Opal, Bronze Mosaic and Duotone Brown roofs come mixed in the bundle—ready to lay.

For further details and literature, write to

The RICHARDSON COMPANY

Lockland (Cincinnati), OHIO

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See other side

An Oak Floor is NOT expensive



OAK is Nature's gift of everlasting beauty.

First cost is less than many temporary floor coverings, and is negligible for permanent floors that never need replacement, and that return many times the original investment in increased value. The various grades of oak flooring, all equally sound, permit variation in room treatment, and serve to keep the total cost within the lowest budget.

Beauty and distinction

Oak floors are a part of the decorative furnishing of a room, and may be as distinctive as pictures, rugs or furniture. Nature grows in oak a beauty of grain and figure that cannot be successfully imitated, and which may be finished to harmonize with other woodwork. In old homes, lay oak over worn floors, to modernize the house. Quote costs by the room; prospects will be surprised at the reasonable figure, less than many articles of furniture in everyday use.

Make use of our technical service

Our experts will assist you in solving any floor problem, without obligation. Such questions as suitability of grades, widths and thicknesses, proper laying, nailing, and finishing are fully covered in literature sent free on request.



"How and Where to Use Oak Floors"

How to figure accurately and quickly the amount of oak flooring required on a job is explained in the booklet, "How and Where to Use Oak Floors"—together with grading rules, standard measurements, and other technical data valuable to contractors and builders.

Write for it.



Have you read "The Story of Oak Floors?"

This illustrated 24-page booklet explains how to modernize and beautify any home. It contains plates of the new color finishes which harmonize with walls, rugs, and hangings, and which give variety and individuality to different rooms.

Mail coupon for your free copy.

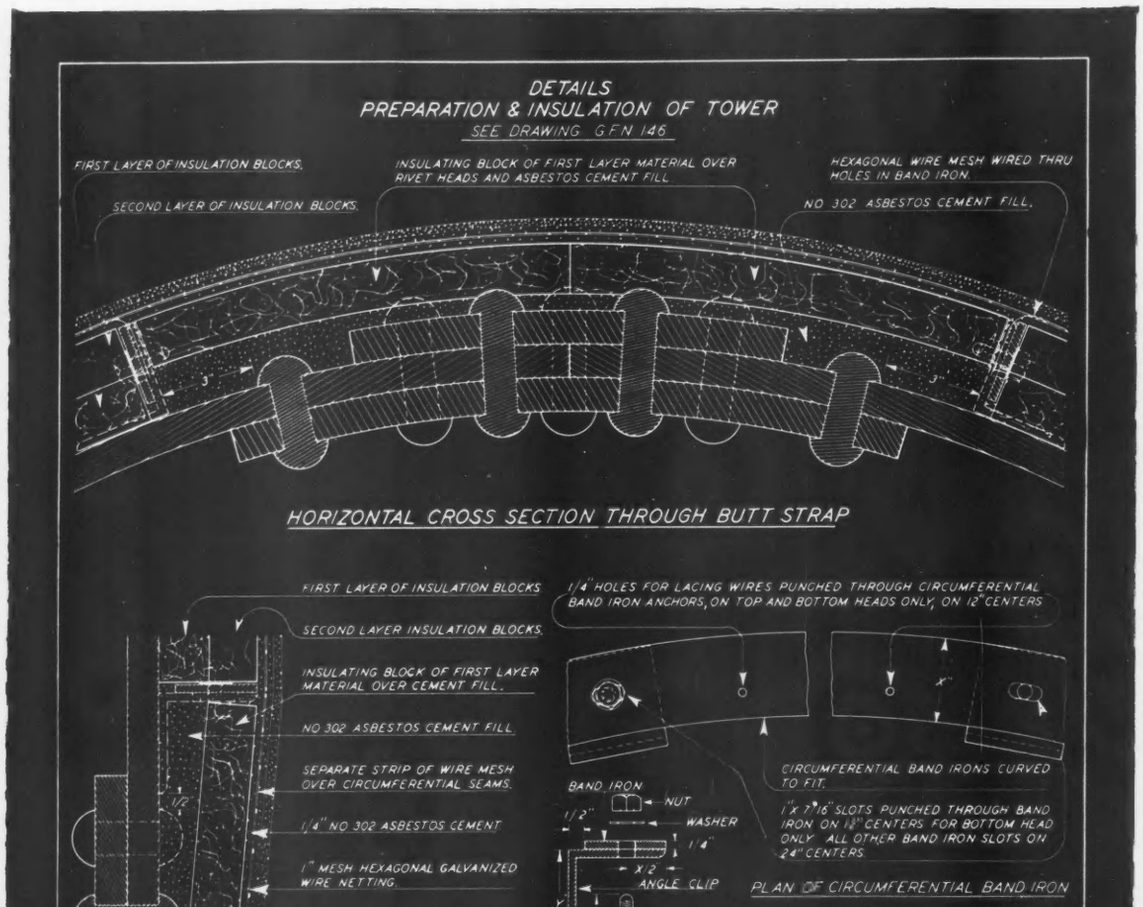
Free OAK FLOORING BUREAU
838 Hearst Building, Chicago

Send me your free, illustrated book, "The Story of Oak Floors."

Name _____

Address _____

PERFECT UNIFORM LETTERING



SEND TODAY FOR CATALOG

The above illustration reproduced through the courtesy of *Johns-Manville, Inc.*, is an unretouched photographic reproduction of a typical drawing lettered throughout with

WRICO LETTERING GUIDES

These instruments are *saving time* and improving the appearance of maps and drawings in *thousands* of other drafting rooms.

THE WOOD-REGAN INSTRUMENT CO. Inc.
154 Nassau Street New York

The Wood-Regan Instrument Co., Inc.
154 Nassau Street, New York

Gentlemen:

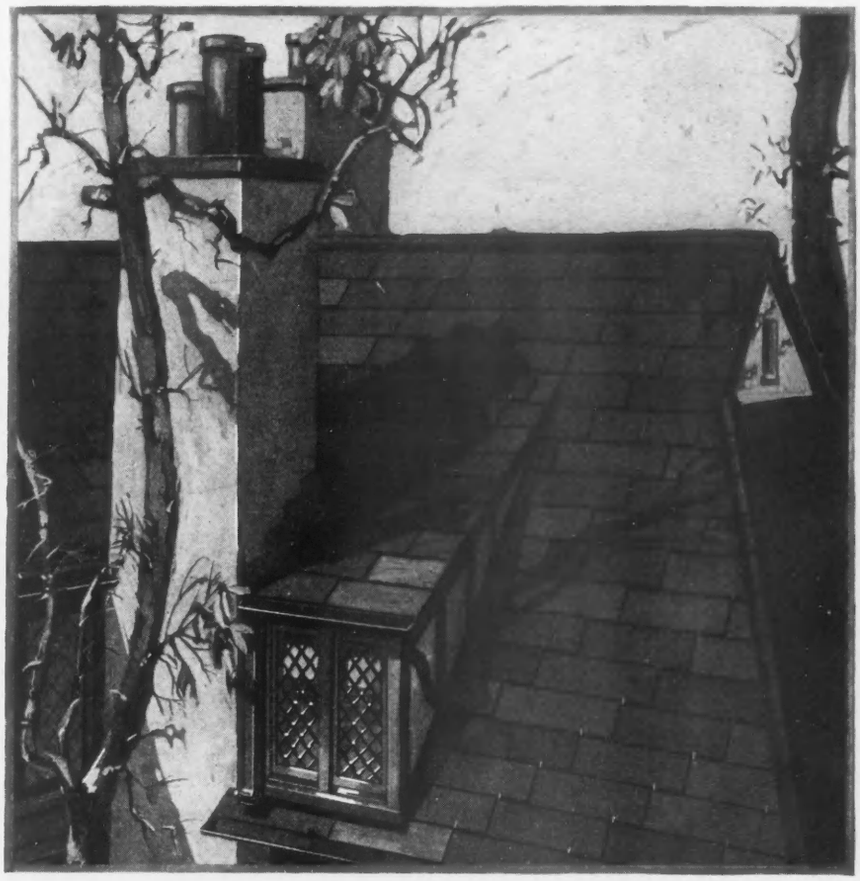
Please send me a copy of your illustrated catalog and price list containing full particulars concerning WRICO LETTERING GUIDES and PENS.

NAME .....

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AB-A



The horizontal method
Developed by Eternit

THE advent of the Horizontal Method of applying asbestos shingle marks a distinct advance in asbestos roofing. A roof achieved with this new shingle appeals alike to the architect, the contractor and the home owner.

The Horizontal type of shingle gives a beautiful tone to the roof as each shingle casts a deep shadow—a feature which architects have desired and one which owners will find adds greatly to the beauty of their homes. Moreover, with this type of shingle, there are no straight lines up the roof—each course breaks joints with the adjacent one above and below. This insures an irregular effect which adds further to the attractiveness of roofs of this type.

The new Horizontal shingle is practically as low in price as the inexpensive hexagonal type. With this method of application, labor costs are materially reduced. The Horizontal method can be laid more rapidly than any other because fewer shingles are needed and the lines are easily followed.

The Horizontal Method Asbestos Shingle may be applied right over old wood or asphalt shingles. There is no dirt, no litter, no wasted time in removing old shingles. The finished job is a two-thickness, doubly-protected, fireproof roof.

Literature giving full directions for layout and other information will be mailed promptly upon request.

Address

American Insulation Company
Roberts Ave. & Stokley St., *Philadelphia*

Eternit

ASBESTOS SHINGLES

Announcing a new design in asbestos shingles

A new method of laying shingles . . .

—gives beautiful tone to roof . . .

—each shingle throws a deep shadow . . .

—applied rapidly, saves labor costs . . .

—price of roof practically as low as the inexpensive hexagonal method

Eternal

Lasting qualities—a roof that cannot possibly wear out or deteriorate.

Fireproof

as well as stormproof—roof fires from flying sparks, the third greatest cause of all fires, is absolutely eliminated.

Beautiful

effects from color combinations — attractive grays, reds, browns, blues, greens.

Adaptable

to all types of buildings. The different styles and the many colors offer a selection for the finest residence, or buildings of less costly construction.



Asbestos Shingles – *the popular roof for modern homes*

THE popularity of the rigid asbestos shingle as a roofing material has increased tremendously during the last few years.

Today, the asbestos shingle is unquestionably the finest type of roofing obtainable; no matter from what angle the material may be judged either by the home owner or the contractor or builder.

There is a popular misconception that Asbestos Shingles are expensive. This was true from a first-cost standpoint a few years ago. But with their popularity ever on the increase, improved methods of manufacturing were developed and production costs cut so that today an asbestos shingle roof costs practically the same and in many cases less than other forms of roofing.

In other words, with ETERNIT Asbestos Shingles, you now can have an eternal roof for practically the same amount that a ten-, fifteen- or twenty-year roof would cost. Moreover, the ETERNIT roof saves all the expense, trouble and inconvenience occasioned by the frequent repairs necessary to keep an ordinary type of roof weather-proof! Write for full particulars regarding the advantages of ETERNIT Shingles over other forms of roofing.

American Insulation Company

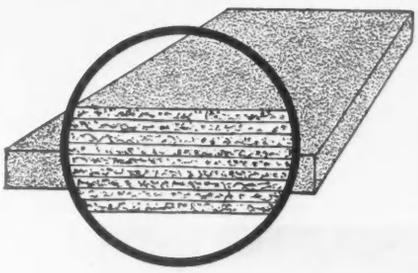
Roberts Avenue *and* Stokley Street, *Philadelphia*

Eternit

ASBESTOS SHINGLES

Eternal safety and satisfaction

DON'T confuse ETERNIT with ordinary molded asbestos shingles. ETERNIT Shingles are made from the finest grade of South African asbestos fibre and Portland cement. These materials are combined by a process of laminating (built up, layer upon layer).



Close examination shows the evenly distributed fine layers of asbestos fibre in the shingle. This fibre is the binder that gives the shingle its strength. The even distribution which is made possible only by the laminated process of manufacture, assures equal strength all through the shingle. This result cannot be obtained by simply molding a mass of fibre and cement under pressure. A shingle is only as strong as its weakest spot and the ETERNIT process is designed to eliminate the weak spots.

ETERNIT Shingles might better be termed tough rather than just strong, because their strength is not of the brittle variety. They have a wiry resiliency which makes it possible to bend them without breaking. An ETERNIT Shingle under the test as illustrated here, shows greater flexibility than any other asbestos shingle. This flexibility has a real, practical value to buyers of ETERNIT Shingles—both to roofers who apply them and to home owners. It permits of walking upon an ETERNIT roof and allows for ordinary expansion and contraction, without danger of cracking the shingles and causing leaks.

ETERNIT Shingles can be more easily handled and applied for this reason. Once on the roof, they will withstand all ordinary wear and tear and will last as long as the building itself.

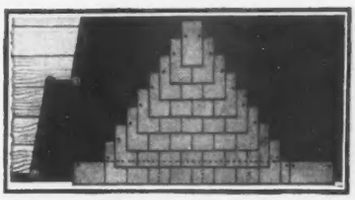


Note: Every ETERNIT Shingle is trademarked with the word ETERNIT. This mark is for your protection. Look for it and be certain you get ETERNIT quality.

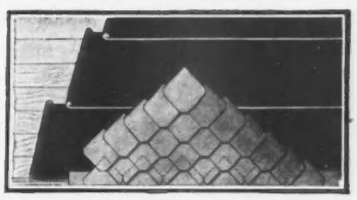
Full details regarding the application of all forms of ETERNIT Asbestos Shingles as well as prices and dealers' terms will be supplied promptly upon request. Write!

American Insulation Company
Roberts Avenue *and* Stokley Street, *Philadelphia*

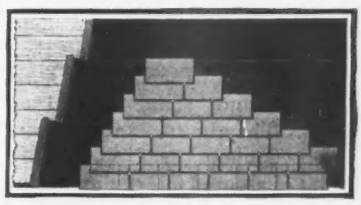
Eternit
ASBESTOS SHINGLES



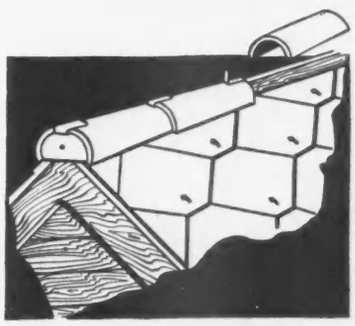
American Method



Hexagonal Method



Horizontal Method



Application of Ridge Roll

Colors:

Colonial Gray
Indian Red
Quarry Blue
Autumn Brown
Copper Green

ELECTRIC WIRING AND EQUIPMENT

Adequately Wiring the Home

A Vital Opportunity Afforded Home Builders by the "Red Seal Plan"

By HARRY B. KIRKLAND

Of the Society for Electrical Development

THE keynote of success in industry today is service. This means that all industries playing a part in the construction of homes for the public should always keep in mind that the future occupant is the person who must be satisfied. When the builder advertises to the public he does not try to prove that his houses are better places to live in than cold damp caves. Human beings have known this for a long time. The builder must prove in the face of heavy competition that his houses are preferable to those of someone else.

Houses of a given price and locality do not differ essentially in their physical makeup. Your competitors see to that. They do not stand by and admire your ideas. They imitate and, wherever possible, improve upon them. Therefore a talking point of assured interest and value which differentiates your houses from those of other builders is patently of inestimable value to you. The Red Seal Plan to assure the convenient use of electric service embodies such a talking point but it is not just an extra flourish of gilt on the gingerbread, as it were. It is as fundamental as modern plumbing.

In the past, wiring the home has been more or less a matter of barter which has resulted in the skimping of this essential. In a measure the builder has been responsible because he failed to appreciate what a reasonably complete electrical installation meant to the home owner and the small amount of additional investment that

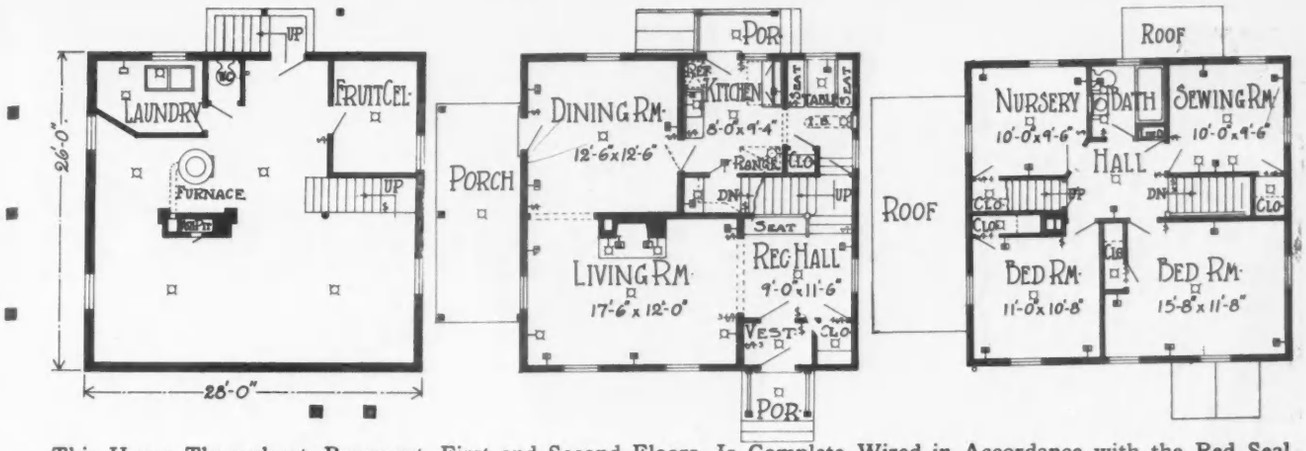


The Public Is Advised by the Red Seal Pledge Card that the House Under Construction Will Be Wired to Assure the Convenient Use of Electric Service.



Red Seal Wiring Can Be Easily Identified by Future Home Buyers. After the house is occupied a small likeness of the official Red Seal Emblem is affixed permanently on some conspicuous part of the electric service lines.

Red Seal Wiring



This House Throughout, Basement, First and Second Floors, Is Complete Wired in Accordance with the Red Seal Plan Which Provides for Every Electrical Convenience that May Be Desired by the Future Owners. DuBois Carpenter, architect.

would be needed.

When the electric lamp was first invented, so radical a departure in illumination brought with it many problems which at that time could not be answered. This meant that the first steps in wiring the home were largely a matter of experiment and the jobs done were of the simplest kind. In its infancy electricity seemed dazzling in comparison with gas or oil lamps, and an adopted overhead gas electric light fixture was regarded as extremely modern.

When the advantages of electrical illumination were appreciated the demand for electric service increased by leaps and bounds, and today we have, out of a grand total of some 23,000,000 homes in the United States, approximately 13,500,000 wired for some degree of electric service. "Some degree" may mean anything from the single drop cord per room to the tastefully lighted homes of those who have become conscious of the value of light and use it both for its decorative and utilitarian features.

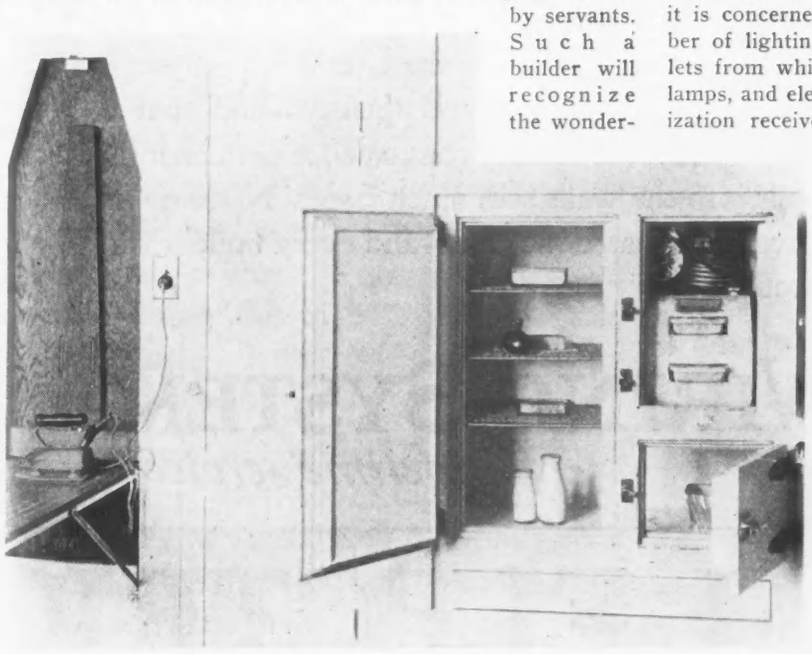
A builder who lives in a house with the usual limited number of outlets is familiar with the maze of wires running to overhead fixtures and wandering along floors that is necessary in order to maintain a few portable lamps in convenient places. He is also familiar with the difficulty of connecting up electrical appliances which are being utilized for the onerous household tasks formerly performed by servants. Such a builder will recognize the wonderful advantages of Red Seal wiring and will embrace it as much for his own personal comfort as he will do for the dwellings he will build for sale.

This plan, known as the "Red Seal Plan to assure adequate wiring for the convenient use of electric service in the home," is national in scope and is sponsored by The Society for Electrical Development created some 13 years ago as a service body for the electrical industry and in turn for the public. This organization, which is non-profit and non-partisan, is consecrated among other things to the work of informing the American public of the many advantages, both economical and practical, of making use of electric service in its many forms.

The method of operating the Red Seal Plan, which is fully copyrighted and protected in U. S. A. by The Society for Electrical Development, is through local electrical organizations which set up a standard practical for all purposes and a marked advance on the inadequacies which obtained previously. The Society takes especial pains to see that these local agencies have the facilities to do a 100 percent job in the interest of the public and incidentally in the service of building interests which gain in a very definite manner from the proper operation of the plan.

It should be remembered that the Red Seal Plan deals only with the adequacy of the installation. That is to say, it is concerned with the installation of a reasonable number of lighting outlets and switches and convenience outlets from which can be operated portable, table and floor lamps, and electrical labor-saving devices. The local organization receives a license to operate the plan from The

(Continued to page 442.)



Two of the Modern Electrical Home Conveniences—Heat and Cold—Made Easily Available When the Wiring Is Done According to Red Seal Specifications.

Suggested Wiring Specifications

Adequate house wiring should consist of the following elements:—

A Safety Meter Service Switch.
A Safety Panelboard.
A Bell Ringer.
Code Wire.
Metal-covered Conductors (BX or Rigid Conduit).
Metal Boxes for Switches, Convenience Outlets and Lighting Outlets.
A Tumbler Switch at Every Doorway to Control Lights.
Convenience Outlets—a Minimum of One for Every 50 Square Feet of Floor Space.
Lighting Outlets—a Minimum of One for Every 50 Square Feet of Floor Space.



On which house can you make more profit?

The G-E Wiring System is a system of housewiring embodying adequate outlets, conveniently controlled, and using G-E materials throughout. If interested, address. Sec. AB-4
Merchandise Department
General Electric Company
Bridgeport, Conn.



HUNDREDS of successful builders are speeding up sales by installing the G-E Wiring System. They find that people are asking about the wiring—that they know the G-E Wiring System means both adequacy and quality—and that a house with comfort and convenience permanently built into the walls sells much faster. Nationwide advertising has done this—and every builder can profit by it.

WIRING SYSTEM
—for lifetime service

GENERAL ELECTRIC

The GE WIRING SYSTEM
—for lifetime service

Made by General Electric

Its value to the builder of homes

TO sell a house or satisfy a client, you build into that house what the prospective owner wants; for you must *sell houses* or *satisfy* clients to make your profit.



Every detail that makes for comfort.

It is for this reason that you put in oak floors, tile bathrooms, breakfast nooks, open fireplaces and nationally advertised heating systems. It is for this reason that every detail which makes for comfort in the home must not only be built into the house, but emphasized in selling.

And none of these has more of an appeal than complete wiring for electrical service. Ten years ago we would have hesitated to make this statement. But today, it is true beyond question.

Through all possible means of advertising, the advantages of electrical service itself, and of appliances which require electrical service, are being sold the American Public. As an example of the work that is being done along this line, we show a small



Some of the 450 million copies of G-E ads which are selling electrical service to the public.

reproduction of a few typical General Electric ads. These are representative of 450,000,000 copies of G-E ads which tell this story each year.

Add to this the millions of copies of electrical appliance ads and you begin to appreciate the tremendous force which is educating the public to the service electricity can render.

Women are reading the "Electrical Relief from Household Drudgery" stories in their magazines and making use of what they learn.

Even people who have long been users of electricity are increasing their consumption at an average of nearly 10% each year.



Plenty of convenience outlets and switches are talking points that satisfy buyers.

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The GE Wiring System —for lifetime service

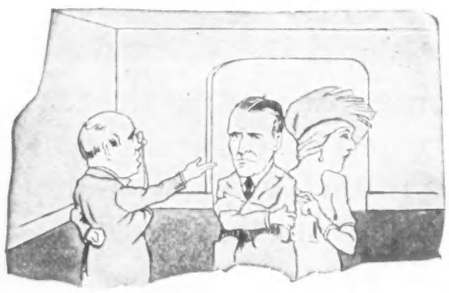
GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

CONSIDER a young couple going through one of your houses. They enter the living room. The hardwood floor, open fireplace, and general arrangement immediately appeal to them, and in their minds they start to plan the furnishings. The big easy chair would go over there in the corner and the bridge lamp beside it—*if a convenience outlet were available.* The davenport would look fine before the fireplace with the long table just in back and a lamp in the center—*if there were a floor outlet there.*

And so they go through the house looking here and there for convenience outlets through which they will light their home and utilize their electrical appliances.

If they don't find them they will not tell you about it, but instead take the easy way out and say "we will be back tomorrow"—and tomorrow never comes.

Switches, or the lack of them, tell the same story—for of all the conveniences of electric service none is more important than



"We will be back tomorrow," say prospects who do not see adequate wiring.

control. With it we may realize the full benefits of electric service. Without it electricity is robbed of much of its convenience—and selling appeal.

Whether you build for resale or for a client, your reputation is wrapped up in every house you build. And in this day you cannot afford to install an inadequate wiring job. Every house you build stands as an



The tremendous attendance at electrical homes is proof of the public's interest in complete wiring.

advertising monument for or against your future business.

It is true that the line has to be drawn somewhere in building comfort and convenience into a home. But complete wiring is *one* comfort you can build in, we might say "at no cost," because the slight additional expenditure necessary to include an adequate and permanent wiring installation of high quality will come back many times in the additional selling price of the house.

There could be no better proof of the interest which the public is displaying in complete wiring today, than the tremendous attendance which electrical homes have drawn in all parts of the country.

In the past few years some 200 of these homes have attracted more than 3,000,000 people, many of whom have stood in line for hours, just for the privilege of spending 15 minutes in a completely wired house.

Show one of these a home equipped with the G-E Wiring System and you have gone a long ways toward making a sale.

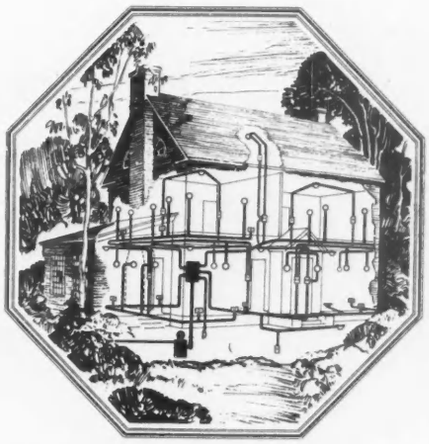
The GE Wiring System —for lifetime service — what it is

The G-E Wiring System, which you have probably seen advertised, is a system of housewiring embodying adequate outlets, conveniently controlled and using G-E materials throughout.

—Continued on next page

GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

The GE WIRING SYSTEM —for lifetime service



The G-E Wiring System includes every essential element from service entrance to point of use

The G-E Wiring System is a unit made up of the following elements:

A G-E Safety Meter Service Switch.
A G-E Safety Panelboard.
A G-E Bell Ringer.
G-E Code Wire.
G-E Metal-covered Conductors (BX or Rigid Conduit).
G-E Metal Boxes for Switches, Convenience Outlets and Lighting Outlets.
G-E Tumbler Switches.
G-E Convenience Outlets.

The above list covers all essential elements from service entrance to point of use.

The G-E Wiring System specifications recommend:

A Tumbler Switch accessible to every doorway for control of lights.

A minimum of one convenience outlet for every fifty square feet of floor space.

A minimum of one lighting outlet for every fifty square feet of floor space.

Why you should specify The GE WIRING SYSTEM —for lifetime service

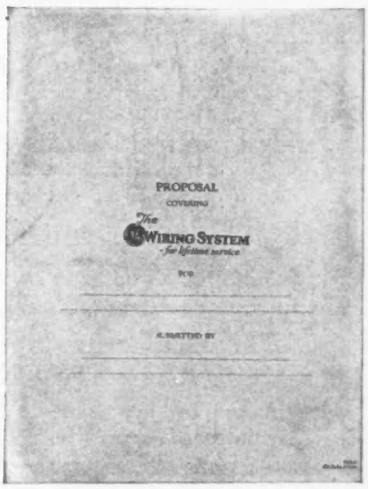
Realizing the necessity for simplification of electrical specifications, General Electric has introduced the G-E Wiring System. Under this plan, builders are assured of quality materials throughout and of an adequate installation without the necessity for detailed specifications covering a wide variety of products.

For the first time since electricity became man's servant, every element necessary for the complete wiring of the home is manufactured by one company and backed by one guarantee.

By specifying the G-E Wiring System you are assured of truly competitive bids from electrical contractors. You know that all contractors are basing their bids on identical material and that variations in bids represent factors which will not affect the quality of the materials used on the job.

When the G-E Wiring System is specified, your client is assured of a complete service which will last as long as the house endures; you are insured against the use of nondescript material; your specifications are simplified; you are relieved of the trouble of examining, classifying and specifying the diversified products of a number of manufacturers; and you retain authority over the wiring installation.

You as a builder will appreciate that the difference between an inadequate job and the G-E Wiring System may mean hundreds of dollars additional profit when the house is sold; that the G-E Wiring System is a talking point in the sale of a house; and that the house equipped with the G-E Wiring System sells faster.



When the G-E Wiring System is specified your client gets complete—lifetime—service.

—Continued on next page

The G-E WIRING SYSTEM —for lifetime service

GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

How to Specify the G-E WIRING SYSTEM —for lifetime service

There are just three things which must be done by the builder in drawing his own specifications for the G-E Wiring System

1. **Make a copy of the specifications shown below.**
2. **Mark a copy of the plans to show location of outlets and switches.**

   The typical wiring diagram on the opposite page will serve as a guide.

   The G-E Wiring System specifications recommend:

   A Tumbler Switch accessible to every doorway for control of lights.
   A minimum of one convenience outlet for every fifty square feet of floor space.
   A minimum of one lighting outlet for every fifty square feet of floor space.

   This furnishes an easily understood rule for adequate wiring.
3. **Submit the specifications and plans to your electrical contractor (or contractors).**

   This is all the information necessary for him to have in order to submit his proposal on the installation of a G-E Wiring System in any house up to $12,000 in value exclusive of the cost of the lot.

ELECTRICAL SPECIFICATIONS FOR G-E WIRING SYSTEM

The electrical contractor shall furnish and install the G-E Wiring System (Group 1—1926) complete from the lighting company's service to all outlets; locating all outlets as indicated on the drawings.

The electrical contractor shall do all necessary cutting for the installation of his work.

The electrical contractor shall leave his work ready for the lighting company to connect to, doing all work required by their rules.

The work shall conform to the rules of the "National Electrical Code" and the local regulations governing electrical installations.

All necessary certificates shall be obtained by the electrical contractor at his expense and delivered to the architect or builder before work is accepted.

The electrical contractor shall guarantee to make good any defects in his work which shall develop within one year of date of acceptance.

The electrical contractor shall furnish and install a complete bell system locating bells and buzzers as indicated on the drawings. The bell system shall be operated by a bell-ringing transformer feeding from a separate circuit on the lighting distribution panel. All bells, buzzers, and push buttons shall be of high grade as approved.

Outlets shall be located as follows:

Wall light outlets: 5 feet 6 inches above finished floor to center of outlet.

Wall switches: 4 feet above finished floor to center of outlet.

Convenience outlets in kitchen, laundry, basement and garage, and in combinations: 4 feet above finished floor to center of outlet.

Convenience outlets in all other locations: In baseboard, mounted horizontally.

Bids shall be submitted in duplicate on G-E Wiring System proposal forms.

EXCEPTIONS AND ADDITIONS TO BE NOTED BELOW

When G-E Wiring System specifications are drawn by the architect, the builder has but to pass them along to electrical contractors with instructions to submit proposals on the G-E Wiring System proposal forms.

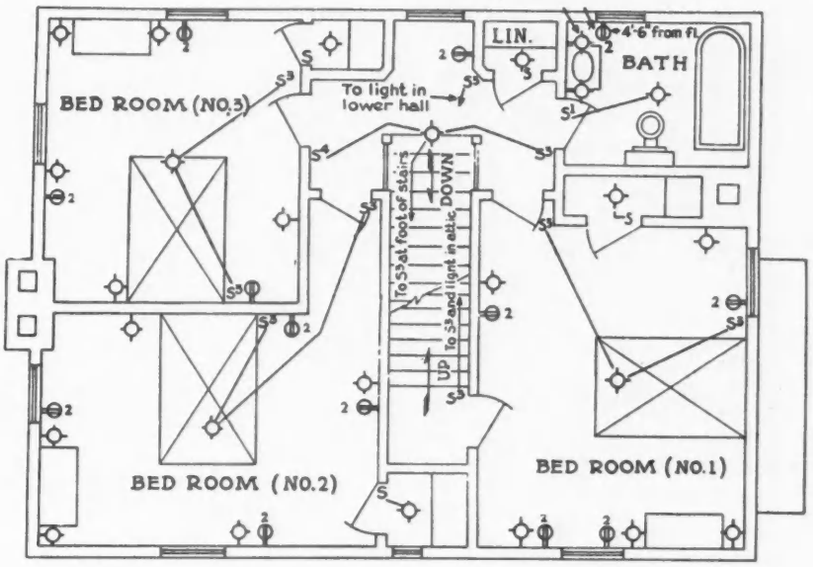
In "The Home of A Hundred Comforts," a publication which may be had upon request, additional typical wiring layouts are pictured. Specifications covering houses valued up to $50,000 may also be secured from Merchandise Department, General Electric Co., Bridgeport, Conn.

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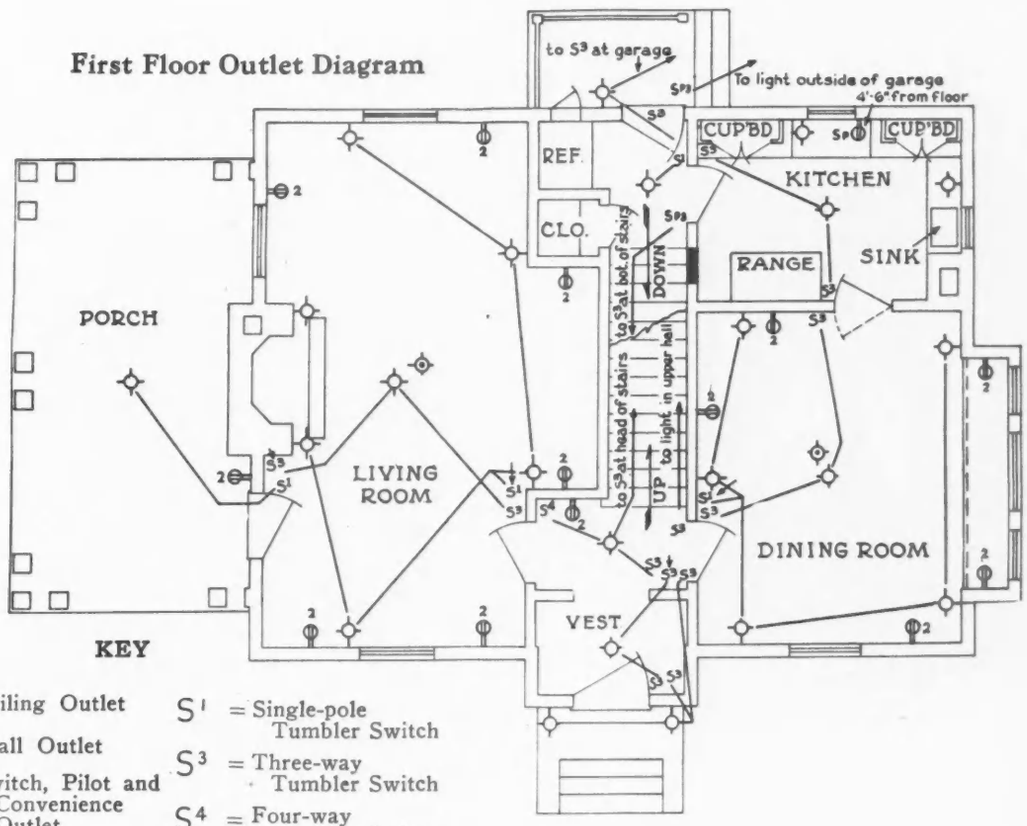
GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

The GE Wiring System —for lifetime service

Second Floor Outlet Diagram



First Floor Outlet Diagram



KEY

- = Ceiling Outlet
- = Wall Outlet
- S^{P3} = Switch, Pilot and Convenience Outlet
- $_2$ = Double Convenience Outlet
- = Floor Outlet
- = Panelboard

- S^1 = Single-pole Tumbler Switch
- S^3 = Three-way Tumbler Switch
- S^4 = Four-way Tumbler Switch
- S^{P3} = Three-way Tumbler Switch and Pilot
- S^P = Tumbler Switch and Pilot

—*Continued on next page*

The G-E Wiring System —for lifetime service

GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

Service by Electrical Contractors

HAVING received your specifications, contractors will submit their proposals on standard G-E Wiring System Proposal Forms, which tell you at a glance exactly what they propose to furnish. By the use of this form, you are enabled to easily and accurately compare proposals, all of which will be on the same basis.

The contractor is able to render this service through the use of a publication furnished to him, which contains all essential information for the rapid and accurate preparation of his proposal. Any reputable contractor may secure this publication "G-E Wiring System Data for Electrical Contractors," upon application to the nearest G-E Merchandise Distributor.

Materials Comprising the G-E Wiring System
(Group 1—1926) are illustrated below

ENTRANCE



(½ actual size)

¾-in. Sprague duct
Rigid Conduit
with suitable Weatherdrip Fittings
Black Enamel Finish

(From lighting companies' lines to panelboard)



(Actual size)

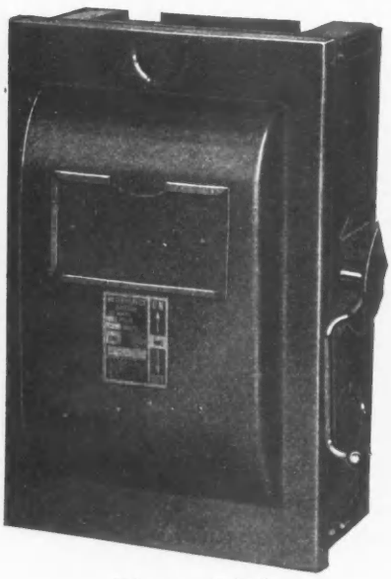
No. 10 Code Wire
(From lighting companies' lines to panelboard)



(Actual size)

No. 8 Code Wire with Suitable Clamps, etc.
(For all grounding)

METER SERVICE SWITCH



(¼ actual size)

Cat. No. GE2351

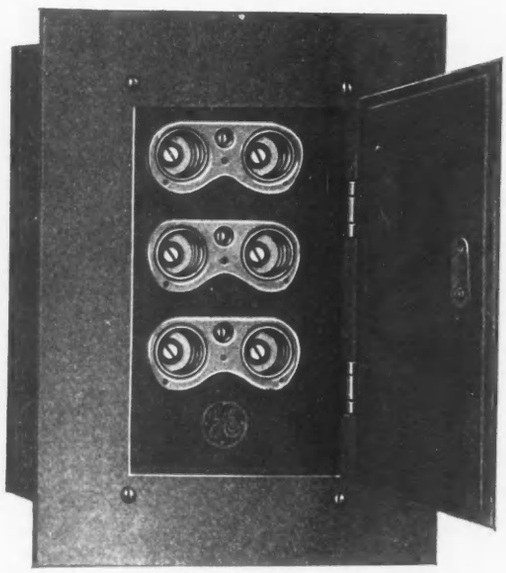
Safety Meter Service Switch
Complete with Fuses

(For two-wire service Cat. No. GE2354 is used)

Note.—In Communities where the local lighting company has standardized on a meter service switch of a type other than that illustrated above, the contractor will substitute an approved switch.

PANELBOARD

The location of the panelboard on the main floor is recommended.



(¼ actual size)

Cat. No. GE2363

Safety Panelboard
Complete with Fuses

(For two-wire service Cat. No. GE2368 is used)

—Continued on next page

GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

The GE WIRING SYSTEM
—for lifetime service

BELL RINGER



(½ actual size)

Cat. No. 179541

Bell-ringing Transformer
(Operated from a separate circuit on the panelboard)

BRANCH CONDUCTORS



(½ actual size)

Cat. No. 14BXSS

"BX" Armored Conductors
Galvanized Finish—Two Conductors



(½ actual size)

Cat. No. 14BX3SS

"BX" Armored Conductors, Galvanized Finish
Three Conductors (For three-way switches)



(Actual size)

No. 18 Code Wire
(For bell wiring)



(Actual size)

No. 14 Code Wire
(For overhead wiring to detached garage)

Armored conductors provide protection against mechanical injury both during and after installation. Furthermore, their use minimizes the fire hazard which may result from short circuits, overheated wires, etc. Therefore, a metal installation is always preferable to a knob and tube installation.

However, where knob and tube wiring is the prevailing custom and local regulations permit, G-E No. 14 Code Wire with suitable loom, knobs, tubes and cleats may be specified for branch conductors.

In transcribing the specifications, it will be necessary to indicate whether "BX" or "Knob and Tube" wiring is desired.

SWITCH AND OUTLET BOXES

A minimum of one lighting outlet to every fifty square feet of floor space is recommended.



(½ actual size)

Cat. No. SP6972

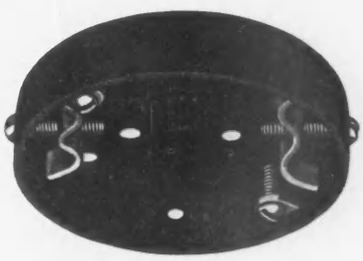
Sectional Switch Box, Black Enamel Finish
(For switches and convenience outlets)



(½ actual size)

Cat. No. SP24151

3¼-in. Octagon Outlet Box
with Fixture Stud, Black Enamel Finish
(For wall light outlets)



(½ actual size)

Cat. No. SP26625

Ceiling Outlet Box with Fixture Stud
Black Enamel Finish
(For ceiling light outlets)

—Continued on next page

The GE WIRING SYSTEM —for lifetime service

GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT BRIDGEPORT, CONN.

CONVENIENCE OUTLETS

A minimum of one twin convenience outlet to every fifty square feet of floor space is recommended.



(½ actual size)
Cat. No. GE2257
Single Convenience Outlet
(For combination mounting)



(½ actual size)
Cat. No. GE2258
Twin Convenience Outlet
(For baseboard mounting)

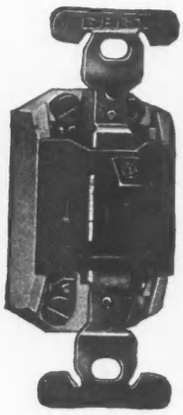
PILOT LAMP RECEPTACLE



(½ actual size)
Cat. No. GE853
Pilot Lamp Receptacle

FLUSH SWITCHES

Switch control at every doorway is recommended with switches located on the knob side of doorway.

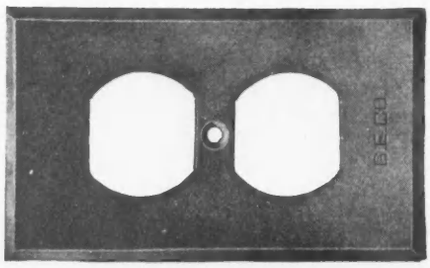


(½ actual size)
Cat. No. GE1690
Three-Way Tumbler Switch. Porcelain Box



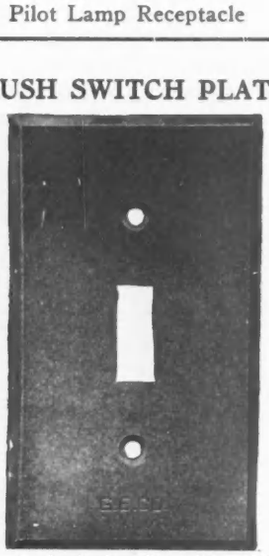
(½ actual size)
Cat. No. GE1688
Single-Pole Tumbler Switch. Porcelain Box

CONVENIENCE OUTLET PLATE

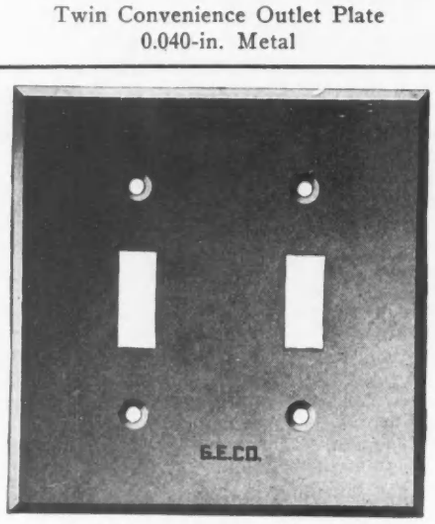


(½ actual size) Cat. No. GE695
Twin Convenience Outlet Plate
0.040-in. Metal

FLUSH SWITCH PLATES



(½ actual size) Cat. No. GE1701
Single Flush Switch Plate
0.040-in. Metal



(½ actual size) Cat. No. GE1702
Two-gang Flush Switch Plate
0.040-in. Metal

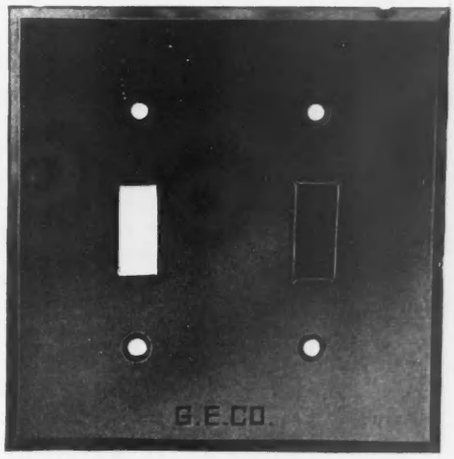
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GENERAL ELECTRIC COMPANY—MERCHANDISE DEPARTMENT
BRIDGEPORT, CONN.

The G-E WIRING SYSTEM —for lifetime service

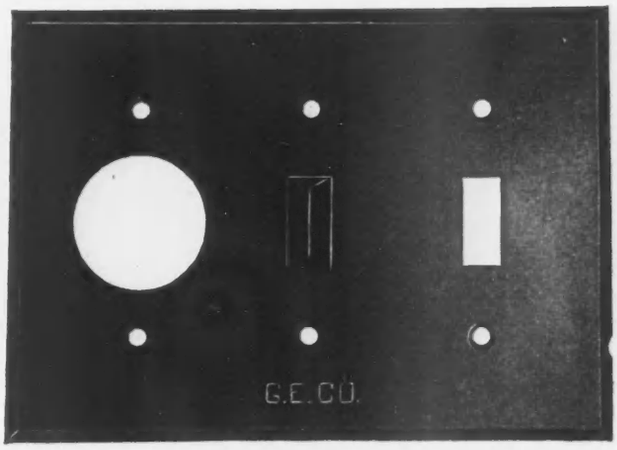
COMBINATION PLATES

The combination of switch and pilot lamp receptacle is recommended for the control of all remotely located lights (garage, cellar and attic lights principally).



(½ actual size)
Cat. No. GE1702
Two-gang Plate with GE2331 Removable Bull's Eye, for Switch and Pilot Lamp Receptacle
0.040-in. Metal

The combination of switch, pilot lamp and convenience outlet is recommended for the connection and control of heating appliances (for the kitchen principally).



(½ actual size)
Cat. No. GE2456
Combination Plate with GE2331 Removable Bull's Eye, for Switch, Pilot Lamp Receptacle and Single Convenience Outlet
0.040-in. Metal

CEILING LAMP RECEPTACLES



(½ actual size)
Cat. No. GE721
Pull Socket Receptacle
(For closets, pantry, etc.)



(½ actual size)
Cat. No. GE1245
Porcelain Pull Socket Receptacle
(For independently controlled ceiling lights in cellar, garage, etc.)



(½ actual size)
Cat. No. GE088
Porcelain Keyless Socket Receptacle
(For switch controlled ceiling lights in cellar, attic, garage, etc.)

LIGHTING EQUIPMENT

An allowance of approximately 3 per cent of the cost of the house is recommended to cover the lighting equipment. The use of lighting fixtures equipped with G-E sockets is recommended.

NOTE

Where local ordinances, the rules of the lighting company or the requirements of the connected load conflict with any item of material covered by this specification, the electrical contractor will substitute material having local approval making the selection where possible from the G-E Wiring System Data Book for Electrical Contractors.

Red Seal Wiring

(*Continued from page 431.*)

Society for Electrical Development and from time to time reports are made and a definite check up is instituted to see that the plan is being operated in conformity with the strict rules and regulations controlling it for the best interests of all concerned.

Red Seal emblem posters are used to identify the home to be wired according to Red Seal standards both during construction and after it is completed. When the home is occupied the posters are removed and a final mark of identification in the form of a Red Seal transfer sticker is placed on a permanent part of the electrical service equipment and the home owner is presented with a Red Seal certificate which forms part of the deeds to the home.

The question will be asked "how does the builder gain from the operation of the Red Seal Plan?" With the increased interest of the public in electric service, which now approaches a definite demand, the builder must be prepared to supply that demand. Adequate wiring installations therefore will mean that the builder has another dramatic talking point in the selling of a home.

In some communities today where the Red Seal Plan is operative, many of the builders have already decided that they will not build any more homes that are not wired according to the Red Seal Plan. In the city of Toronto, Canada, for instance, where the Red Seal Plan was first conceived as an outcome of the Model Electric Home, there are listed no less than 59 builders who make every home Red Seal. The 16 local electrical organizations which operate in these cities cover a territory which includes some 646 communities of 500 population and up, representing 8,631,027 people and some 2,150,000 homes.

California has always been noted for its progressiveness in movements designed to make life more livable, and within the month the California Electrical Bureau has obtained a license to operate the plan in the whole of the state of California. Other places in which the plan is operative are: Syracuse, Rochester, Buffalo and the Niagara Frontiers, Pittsburgh, Louisville, Detroit, Poughkeepsie and the Hudson Valley, Grand Rapids, Minneapolis, St. Paul, Atlanta, Colorado, Tulsa, Memphis, Youngstown.

The floor plans which accompany this article are those of the Red Seal Model Home recently exhibited in Poughkeepsie, N. Y. Compare the number of lighting and convenience outlets with that which you find in the average home and you will note adequacy and maximum convenience without excessiveness. Builders in Poughkeepsie and surrounding communities visited the home, saw the tremendous possibilities offered them, and several have decided to have only Red Seal wiring installations in the homes they build. In Atlanta, Ga., where the plan is operating, a leading builder who specializes in two family houses has made the same decision.

A very gratifying reaction to the Red Seal Plan has been evidenced by the building interests in every part of the country who, appreciating their responsibility to the public, are resolving to utilize every service means put within their reach to construct homes which will be modern not only now but in the years to come.

The Red Seal Plan brings the electric service features of the home up to a standard of adequacy which is certain to create enthusiasm among home buyers and reduce sales resistance. Past experience guarantees it to fully accomplish this purpose, and American builders should be for it 100 per cent strong.

An Electrical Home Complete

By LEE McCRAE

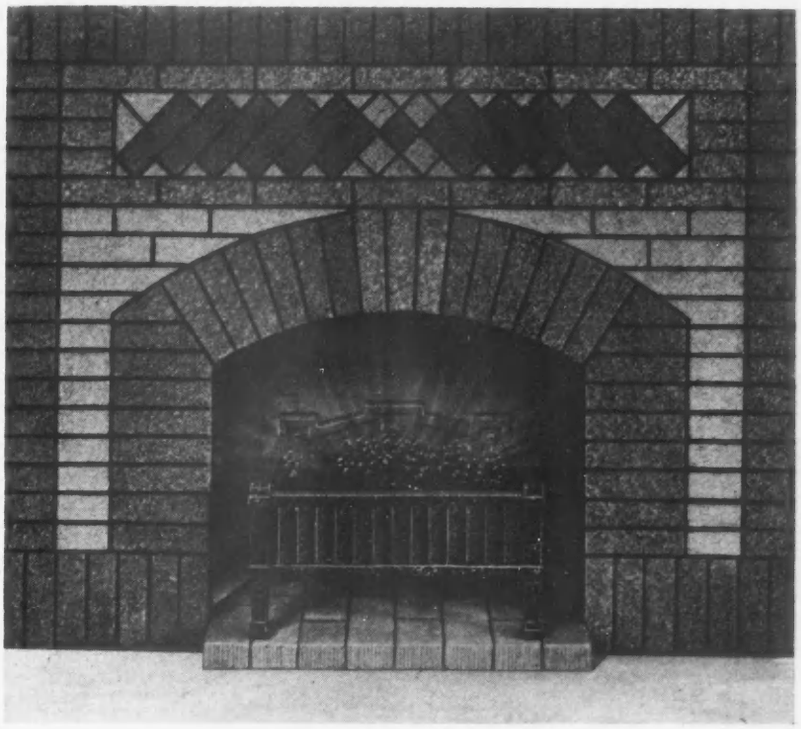
THERE is no other constructed device made by man so typical of himself as the house he builds for his own home. If, given the necessary means, he plans and furnishes it according to his ideas he has shown the world what manner of man he is.

The house pictured here was built by a wealthy man, G. I. Marman, of Sierra Madre, California, yet it contains but five rooms and a den. He was seeking comfort and beauty and the complete exclusion of "help"; a home that

(*Continued to page 446*)

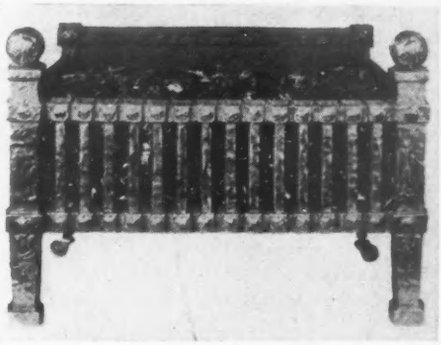


Complete Independence of Servants Was What G. I. Marman, Owner of This Charming Home, Demanded, and the Problem was Solved with the Aid of Modern Electrical Equipment and the Designing Skill of R. M. Finlayson, Architect, of Sierra Madre, California.



Hammered Brass Grate in Antique or Bright Finish. Three sizes, 20 inches, 24 inches and 30 inches.

All Black with Gold Medallions, sizes 19 inches and 25 inches.



Ready Made Ornamental Mantels



A Strong Selling Force In Any House

BUILDERS who install ready made fireplaces find that they meet with the approval of any prospective buyer. Today the Electric Ornamental Mantel is an important factor in making homes more comfortable and beautiful.

Ready made fireplaces have taken the place of the costly old style brick fireplace. They are more artistic. The cost is much less and the weight is about one-quarter of a brick built fireplace. Made of reinforced concrete and have a natural colored stone facing of various colors in a rough texture and cannot fade.

Our Ruby Coal Electric Grate fits into any of our ready-made fireplaces and adds the finishing touch together with real heat to the room. The construction of a model fireplace in your building will save you money and will allow you more space in your living room. No flue needed, clean, odorless and attractive. Let us send you full details of ready-made fireplaces and Ruby Coal Electric Grates.

SEND THE COUPON TODAY

ELECTRIC FIREPLACE MFG. CO.

1908-12 W. Lake St. CHICAGO, ILL.

ELECTRIC FIREPLACE MFG. CO.
1908-12 W. Lake St., Chicago, Ill.

Gentlemen: Please send me full particulars on Ready Made Fireplaces and Ruby Coal Grates.

Name.....

Address.....

City..... *State*.....

SHERARDUCT ∞ OVALFLEX ∞ FLEXSTEEL ∞ FLEXTUBE



Better Wiring *for Better Lighting*



If you are planning electrical wiring send for this illustrated book "Better Wiring for Better Lighting." It's free.

NO MATTER how fine the building there is trouble ahead if the hidden wires—back of walls, buried in concrete—are not properly protected against corrosion, temperature changes and actions of the elements.

National Metal Molding Company conduits provide protection that will last as long as the building itself and there is a type for every need. SHERARDUCT is an easy-bending rigid conduit, protected inside and outside by an alloying of pure zinc with steel pipe. Hundreds of the finest public buildings in America are protected with Sherarduct. ECONOMY CONDUIT, another rigid type is protected by double-dipped acid-resisting enamel baked on. FLEXSTEEL is a flexible armored conduit designed for rough usage and OVALFLEX, a similar type, can be laid on wall surfaces without cutting or grooving, and then be completely covered with plaster. FLEXTUBE, a non-metallic conduit, is built with solid walls like a cord tire and METAL MOLDING is a surface raceway for wires, easily installed where concealment is unnecessary.

LITERATURE DESCRIBING THESE PRODUCTS
WILL GLADLY BE SENT ON REQUEST.

National Metal Molding Company

1414 Fulton Building, Pittsburgh, Pa. [No. 25]

ECONOMY CONDUIT ∞ METAL MOLDING ∞ WIRES

3 Vital Points

to look for when selecting wall brackets



Your customer will be attracted by beautifully designed brackets—but remember that beauty will not make up for mechanical defects. The mechanical end is up to you.

The Candle Socket

must stand straight—and stay straight! What so detracts from the appearance of a handsome bracket as crooked candles? Beaver's have strength designed into them and stay straight. Makers of better grade fixtures have quit trying to save a few mills on a socket only to spend several cents straightening up crooked candles. Look for the name BEAVER on the porcelain.

The Switch

should be of everlasting reliability. It should be of the rotary turn button type. The operation of pull chains unnecessarily strains the bracket arms and bends them askew! It should be Underwriters' approved for 3 Amperes. A switch of lower capacity burns out too easily the first time it is overloaded by an appliance—which you can't safeguard against.

BEAVER 3 Ampere 125 Volt Canopy Switches (made like a watch) are found in most high grade brackets. Turn the bracket around and look for the name.

The Convenience Outlet

in bathroom and kitchen brackets you know is popular. Why confine it to these two rooms? Right in the wall bracket, shoulder-high, is the *logical* place for outlets to feed all "temporary" connections. By "Temporary" connections we mean irons, vacuum cleaners, and all portables and appliances—excepting only some portable lamps used in the living room that should feed from the base board outlets. So give the housewife shoulder-high outlets in the dining room brackets for her breakfast table appliances, in her boudoir near her dressing table for her curling iron, electric radiator, etc. And in *every* room in the house for the vacuum cleaner. For no other feature in the house will she be so grateful as for these shoulder-high, back-saving outlets in the wall brackets!



And they cost but a fraction of a base-board outlet!

Made in white porcelain and also polished black composition. Look for the name *BEAVER*.

FREE SAMPLE on request.

BEAVER

DEPT. 4-A
MACHINE & TOOL CO., INC.
NEWARK, N.J.



Weather-tite and water-proof

Winter's storms or summer's heat cannot break through the protection of a well-built wall of Keystone Red Cedar Siding.

Builders will find a ready appreciation of its high qualities among prospective home buyers, to whom both its beauty and its endurance will appeal strongly.

The ease with which it can be handled and the rapidity with which it can be worked are points which also recommend it strongly to contractors and carpenters.

Write today for additional information about this beautiful lumber.

HAMMOND CEDAR CO., Ltd.
New Westminster, B. C., Canada

Western Red Cedar

"The Wood That Nature Armed Against Decay"

is recognized as the most durable lumber that can be used for outside work, in any place subject to exposure, to dampness or storm. It is practically immune from rot, because of a natural oil which it contains.

KEYSTONE RED CEDAR SIDING

"Smooth as a Kitten's Ear"

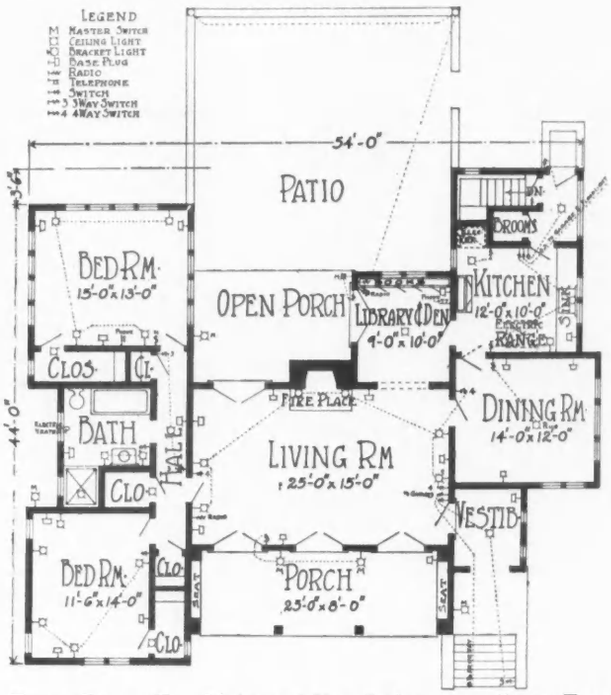
An Electrical Home Complete

(*Continued from page 442.*)

could be servantless, where electricity would do every possible task, leaving him and his small household to real privacy and independence.

The result is not a "show place" or a place of great hospitality, but it is a peculiarly artistic and enjoyable abode in which that mystical force, electricity, performs all sorts of modern miracles—lighting, heating, cooking, cleaning, ventilating, ice-making, entertaining, even burglar-proofing!

The exterior is the popular Spanish type of cream-colored stucco, red tiled roof, and red brick finish along the steps and over the court. The entrance, entirely separate from the front gallery, has a dignified simplicity that is charming. It has no adornment save its two small, high, iron-barred windows and antique lanterns. The covered porch along the south side of the 25-foot living room is quite wide, and the nook in the solid wall at either end, with its deep seat and pile of gay pillows, is an idea worth copying. French doors open upon this as upon the uncovered porch and patio at the rear.



Every Room Has Light and Ventilation on at Least Two Sides and Is Provided with Complete Electrical Service Including a Telephone.

Another splendid feature of the plan that is seldom found in small homes is that entrance to the bedrooms, or toward the service rooms through the den, may be had from the garden, so that one does not necessarily pass through the living room to enter or leave the house. When company is being entertained this is a great convenience to the other members of the family. In chilly weather the sunny south porch is the choice gathering place, while in hot summer days the open porch to the north and its patio enclosed by a 4-foot stucco wall is preferred.

Interior arrangements are most convenient. With the service rooms all toward the right, separated by an unusually large living room in the center, there is absolute quiet possible in the sleeping quarters, the two large bedrooms with their roomy closets, bathroom and hall. Every room in the house has light and air on at least two sides, and both bedrooms have both morning and evening sunlight, something that means much in times of illness.

(*Continued to page 470*)

Levolier
REG. U.S. PAT. OFF.



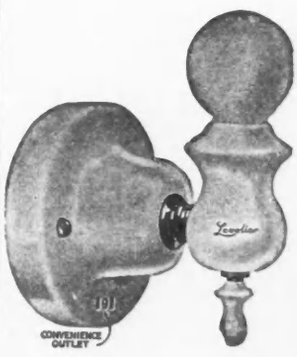
Delights as it Lights

Snow-White and All Right

Porcelain Brackets

Levolier White Glazed Porcelain Sanitary Brackets are fixtures of great utility for bathroom, pantries, kitchens and laundries. Their snow-white beauty harmonizes well with the decorative note of these rooms. Made of pure white porcelain that never soils—can always be kept clean merely with a damp cloth.

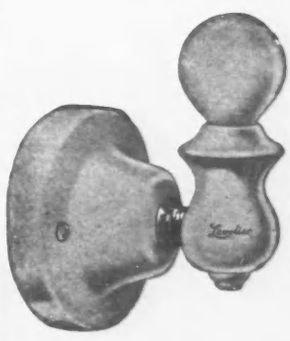
The lever control at the bottom of the socket is new and most convenient. Heavily insulated for safety against shock. A slight push or pull in any direction with the finger will turn the switch on or off. Can also be furnished with a keyless socket that has no lever. Harmony of contour is preserved, however, with a button that adds to the symmetry of the wall bracket.



The convenience outlet or receptacle built into the base or canopy is an economy feature. It saves the price of an extra circuit run to a baseboard receptable.

Brackets can be furnished with or without lever or convenience outlet. They can also be inverted with the lamp illuminating downward.

Send for New Descriptive Bulletin



Levolier
Pull Sockets
Pull Hooks
Conduit Box, Fixture, Lever, Pull and In-Between Switches
Hickeys

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA

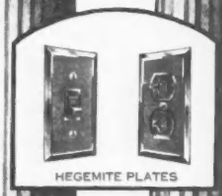
LOMO
Lamp Guards
Lamp Coloring and Frosting
Soldering Flux
Blow Torches
Lamp Changers

H & H DEVICES





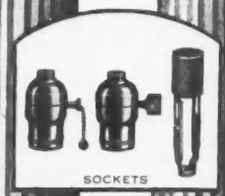

SUPPORT YOUR WORK

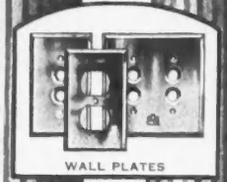

HEGEMITE PLATES


CONVENIENCE OUTLETS

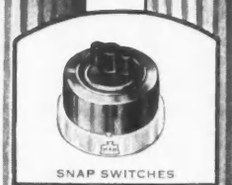

TUMBLER SWITCHES


PUSH-BUTTON SWITCHES


SOCKETS


WALL PLATES


WARNING LIGHTS


SNAP SWITCHES

In control of Conveniences

Four walls around a hundred conveniences:—that is the owner's ideal and the builder's appeal.

Light, heat, household aids at the press of a button: *that* is modern convenience. Its symbol—and control—is the Electric Switch.

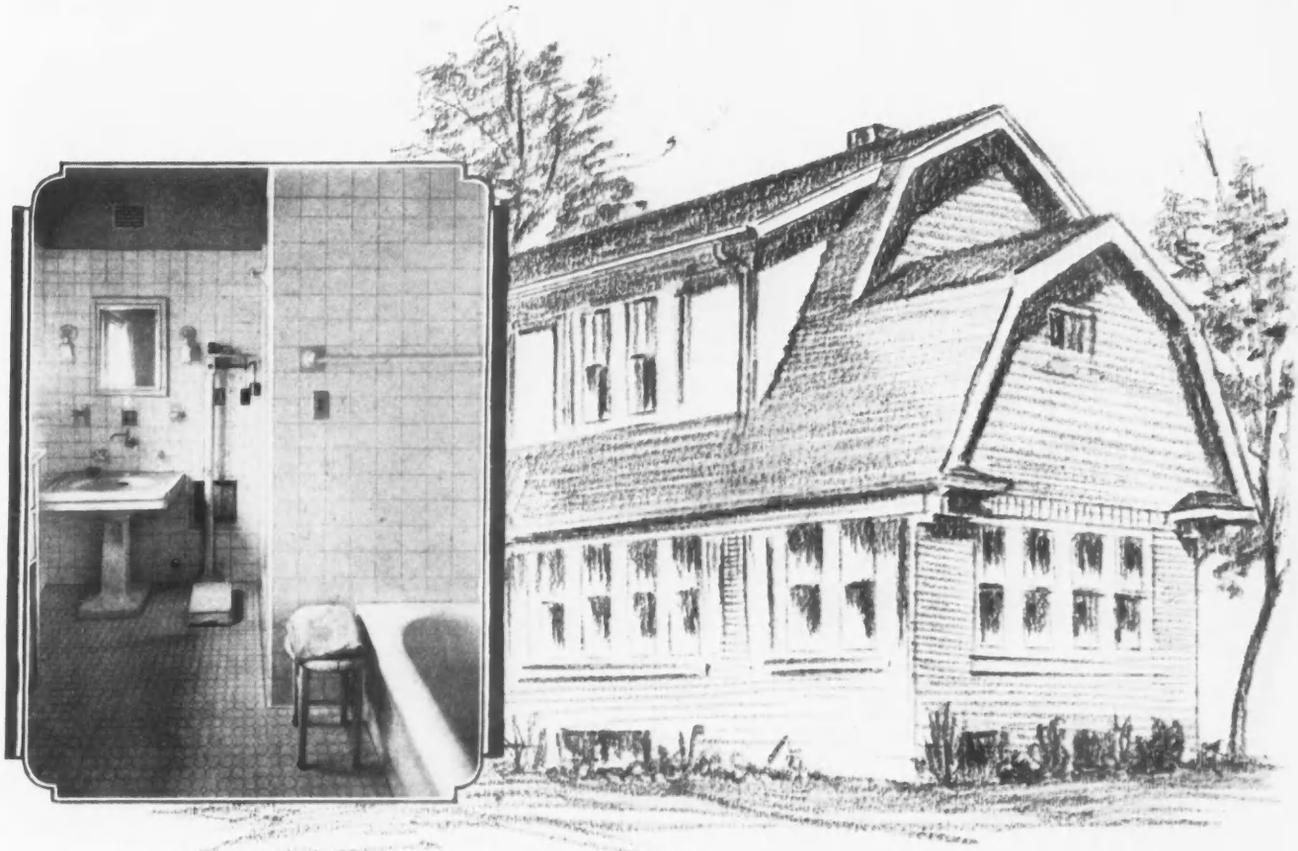
Your building owner will switch into service these comforts of modern housing, just so long as the switches stand and the wiring job is dependable.

The finger on the electric switch will touch the facts of DEPENDABILITY, and point to the lasting worth of your building job.

Your Electrical Contractor will share your view that the Wiring Devices be picked from the H&H Catalogue.

THE HART & HEGEMAN MFG. CO.
HARTFORD, CONN.

Every House Buyer Wants TILED BATHS *and* KITCHENS



SHOW the prospective buyer into a bathroom that has a tiled floor and wainscot—into a kitchen beautiful and spotless because of Tiles—and you're bound to hear words of delight and approval.

This all means a quicker, better sale.

Association Tiles serve both parties to the transaction. They are worth several times their cost to the builder and seller, and worth an untold amount in day-by-day service and enjoyment on the part of the owner.

In proportion to cost, there is no building asset equal to Tile.

Put Association Tiles in the bathrooms and kitchens of every house you build.

Ask Local Tiling Contractors for Suggestions

ASSOCIATED TILE MANUFACTURERS
1102 Seventh Ave. Beaver Falls, Pa.

USE ASSOCIATION TILES

ALHAMBRA TILE CO., Newport, Ky.
AMERICAN ENCAUSTIC TILING CO., Ltd., Zanesville, Ohio
BEAVER FALLS ART TILE CO., Beaver Falls, Pa.
CAMBRIDGE TILE MFG. CO., Covington, Ky.
GRUEBY FAIENCE & TILE CO., Perth Amboy, N. J.
MATAWAN TILE CO., Matawan, N. J.
MOSAIC TILE CO., Zanesville, Ohio
NATIONAL TILE CO., Anderson, Ind.
OLD BRIDGE E. B. & TILE CO., Old Bridge, N. J.
OLEAN TILE CO., Olean, N. Y.
PERTH AMBOY TILE WORKS, Perth Amboy, N. J.
THE C. PARDEE WORKS, Perth Amboy, N. J.
UNITED STATES ENCAUSTIC TILE WORKS, Indianapolis, Ind.
WHEELING TILE CO., Wheeling, W. Va.

Radiator Furniture for Beautifying Homes

LIKE every other item of equipment for the home, the radiator has undergone an evolution from the purely utilitarian designs to designs which incorporate harmonious beauty without interfering with the practical usefulness of the appliance. For home installation even the early radiators were painted, usually with aluminum or gilt paint, to make them less unsightly but little other attention was given to the question of appearance and people were satisfied with the new type of heater merely for its practical qualities.

Later it was found that the metallic colors interfered with radiation and that other types of paint were more satisfactory in this practical way while harmonizing better with the decoration of the room. At the same time the form and placing of radiators was given more attention.

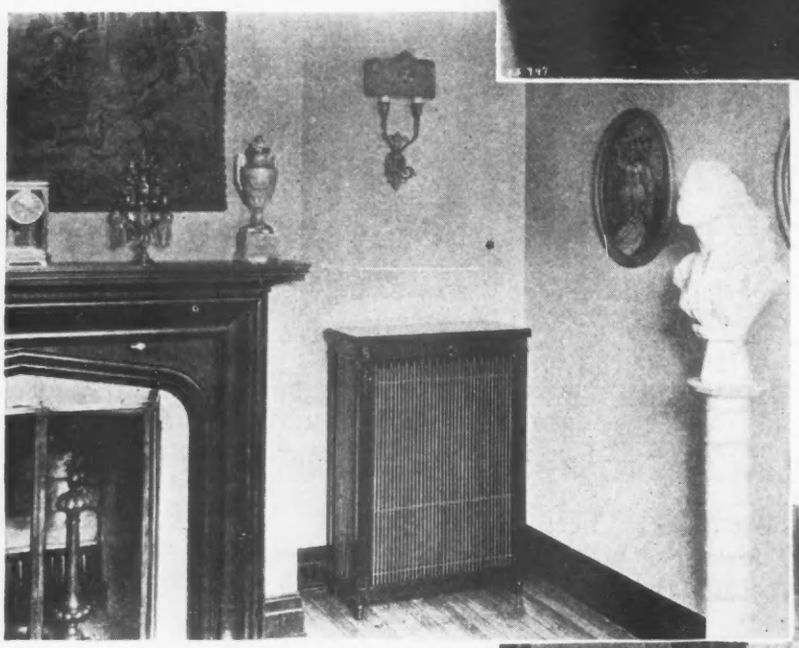


Sheet Steel Perforated in a Perfect Reproduction of Cane Is One Attractive and Popular Style of Radiator Furniture.

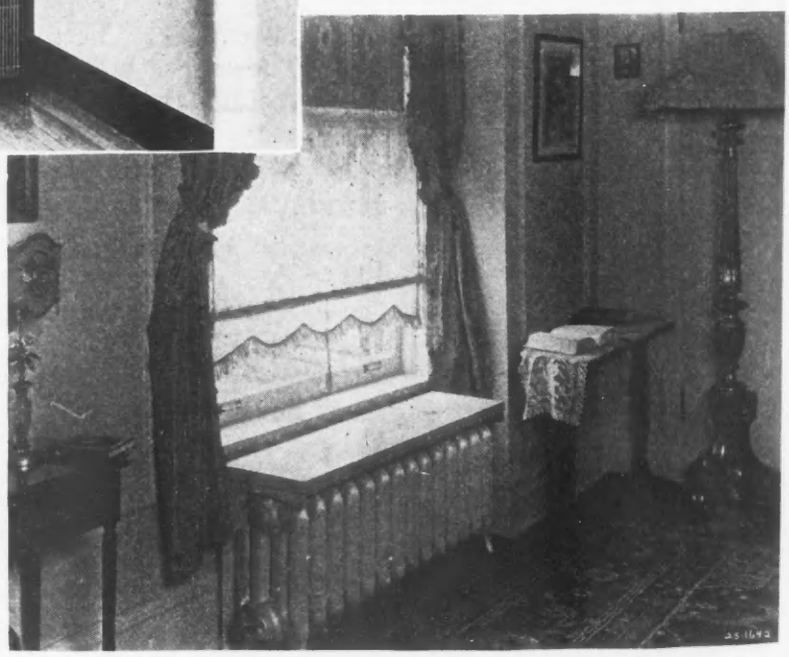
But the most recent step in the development of the radiator, the radiator enclosure, has made it a beautiful piece of home furniture. Radiator furniture is now being made in a multitude of designs which will harmonize in color and style with any decoration and furnishing which may be chosen for the home.

This furniture, of sheet steel, if of two types, the cover which merely forms a top over the radiator and the cover which is a complete housing for it. Each type serves two very practical purposes, most conspicuous of which is the protection of walls and draperies against dirt. Also this radiator furniture is frequently so designed that the efficiency of heating is increased by throwing the heated air forward into the room instead of straight up from the radiator.

The second type of radiator furniture affords all of the practical advantages of the other and at the same time places a much greater emphasis on the matter of beauty. Grill and cane effects are most frequently seen and the metal is finished in any desired color or in imitation of wood.



Radiator Furniture with Grille Finished in Beautifully Grained Wood Effects Add to the Charm of the Room.



Radiator Furniture Not Only Improves the Appearance of the Room but Also Improves the Heating Efficiency as Well. A large quantity of water can be evaporated from the pan under the ornamental seat assuring healthful moisture in the home.

HARDINGE BROTHERS, Inc.

4153 Ravenswood Avenue :: Chicago, Illinois

Domestic and Industrial Fuel Oil Burners

"Bungalow to Skyscraper"

MANUFACTURERS:

The Hardinge Fuel Oil Burner is manufactured by Hardinge Brothers, Inc., Chicago, Illinois, a 35-year old company whose products are known and used throughout the world. Among the products which they originated are Hardinge Watchmen's Clocks and the famous "Cataract" line of precision tools. Hardinge Brothers, Inc., stand solidly back of every product bearing their name.

HARDINGE FUEL OIL BURNER:

The Hardinge burner has been successfully operating for more than six years. It is a recognized success.

APPROVED BY UNDERWRITERS:

Both domestic and industrial types of the Hardinge have been approved by the Underwriters' Laboratories, Inc.

EASILY OPERATED:

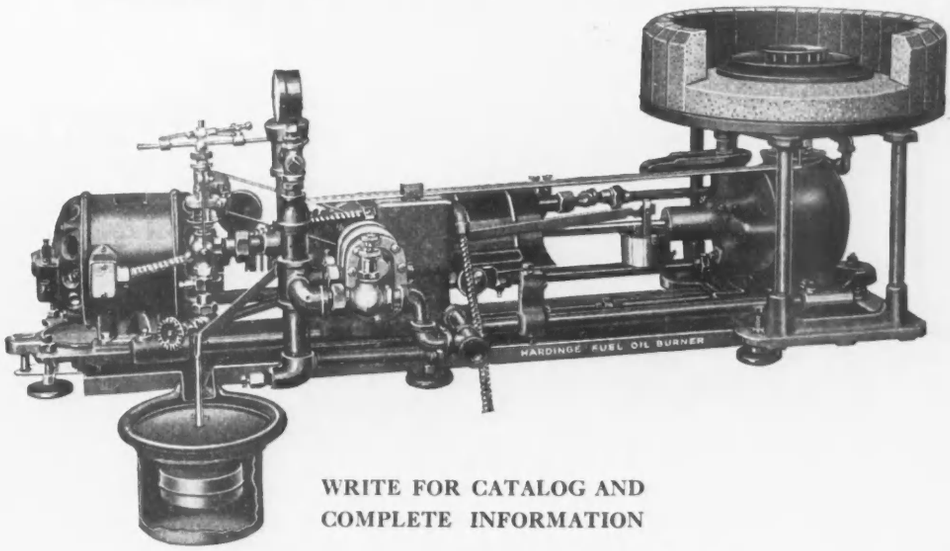
The Hardinge is easily and simply operated. Thermostatically controlled.

There are no particles of coal or dust to track upstairs.

GUARANTEED FOR TEN YEARS:

All Hardinge burners, manufactured since April 1st, 1925, are covered by our iron-clad ten-year guarantee.

HARDINGE FUEL OIL BURNER



WRITE FOR CATALOG AND COMPLETE INFORMATION

HARDINGE BROTHERS, Inc.

4153 Ravenswood Avenue, Chicago

RANGE:

The Hardinge burner is built in a wide range of sizes, for both domestic and industrial installations. "Bungalow to Skyscraper" correctly describes the range of this burner.

SOOTLESS, SMOKELESS:

The Hardinge is sootless and smokeless, and practically noiseless. All working parts are immersed in oil. The basement is always clean.

ABSOLUTELY SAFE:

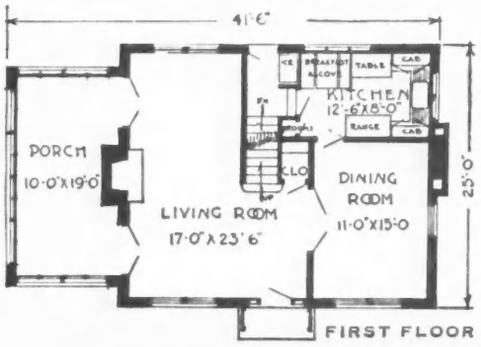
The Hardinge is absolutely safe and dependable at all times. If for any reason the fire should become extinguished, the flow of oil automatically ceases.



This is the house that "Better Homes in America" built in Chicago last summer. It is A. F. B. A. Six-Room House No. 627-A. The pen sketch and floor plans are taken from our six-room "Bungalow and Small House Plans." The pictures clearly indicate how well A. F. B. A. houses build.







Grow with the Demand for Face Brick

THIS Association has gathered all the information a contractor needs to equip himself to build Face Brick houses, and to profit by the ever increasing popularity of this material. The ground is thoroughly covered in the booklets listed.

"A Manual of Face Brick Construction," 116 pages, a text book on the three types of Face Brick wall construction, giving the contractor all the information he needs in building Face Brick houses. Sent for one dollar.

"Face Brick Bungalow and Small House Plans," a series of 120 designs of Face Brick houses, distinctive in design, convenient in floor plan and economical to build, issued in four booklets showing 3 to 4-room houses, 5-room houses, 6-room houses and 7 to 8-room houses. The set, one dollar; single booklets, 25 cents each.

"The Home of Beauty," fifty 6-room houses selected from a nation-wide architectural competition. Sent for 50 cents.

"Two Apartment and Double House Plans," 14 attractive designs of duplex and double houses, showing 28 plans of 5 and 6 rooms each. Sent for 25 cents.

For all of the houses shown in these booklets complete working plans, specifications, etc., are available at nominal prices.

AMERICAN FACE BRICK ASSOCIATION

1763 Peoples Life Building · Chicago, Illinois

THE "PRESTO"
Disappearing Sliding Stairs

"WORKS LIKE MAGIC"

BUILDERS: Here's your opportunity to make extra profit! All new homes and many old ones are prospects. Many people want that extra room in the attic, but don't know how to arrange for it. A "Presto" Stairway is the answer. Saves nearly half a room—slides up out of sight when not in use.

Easy to Install **Practical** **Simple** **Efficient**









This illustrates a stairs installed in hallway. Quickly accessible, easy to operate.

Panel Only Visible When Closed



Some of Its Many Advantages

It replaces the space consuming stationary stairway and provides quick and convenient access to upper floor.

It is often used as a ventilator by leaving the stairs in a half open position.

It is inexpensive, not alone in first cost, but in installation. Any carpenter can put it in an old home in a day's time at the most, and in a new home prepared for it in a few hours.

It is being used extensively to make livable rooms out of attics in houses and bungalows

Also used frequently in garages, office buildings, schools, hospitals, summer cottages, etc.

A Wonderful Space Saver

It is estimated that $500 to $1000 is added to the value of any house where our sliding stairs is installed. The "Presto" makes it possible to utilize that space in the attic which otherwise might be wasted. The space can be used as a playroom for the children, a spare bedroom, drying space, poolroom, etc.

Patent Applied For

Cut shows the "Presto" tucked away in attic when not in use. Very little space is needed.

Prices and descriptive literature sent on request.

SEE PAGE NO. 26 FOR OUR AD ON THE "INADOR" IRONING BOARD.

FARLEY & LOETSCHER MFG. CO.

MAKERS OF

SASH Qualitybilt WOODWORK DOORS

777 WHITE STREET DUBUQUE, IOWA, U. S. A.



GAS SERVICE AND EQUIPMENT

General Data on Gas Piping, Flues and Appliances

By A. W. HUMM

Chairman Architects' and Builders' Service Committee of the American Gas Assn.

GAS is a clean, reliable and convenient household fuel for cooking, water heating and room heating as well as for other domestic uses. It is also an economical fuel for these purposes. Among its chief advantages are: freedom from smoke and soot, constant supply ready for any demand, simple control and ease of heat regulation, efficiency per dollar cost, and no investment in fuel required previous to use.

Economy in Gas Service

Gas should never be wasted, but neither should the cost of gas for domestic use be reckoned solely by the monthly bill. Real economy in home planning and budgetting for household-management should be reckoned along the lines of the needs and requirements of the household, both present and future. Check off the items chargeable to other fuels, and credit to gas service—the satisfaction of a constant supply of fuel that requires no money in advance, no storage space, no labor, no dirt, dust or ashes. A service that carries the assurance of entire freedom from costly annoyance. In short, efficiency, which is after all, only another word for economy. In figuring building costs, do not limit on necessary gas piping, flues and appliances. The time is not far distant when gas will be the universal fuel for all household heating processes.

In designing and building a home, builders (in an effort to keep down the initial cost) often provide the very minimum gas service and appliances—sometimes only a range, seldom more than a range and water heater. Even in selecting the types of ranges and heaters, the low price factor has been used as a guide. This effort to maintain a low initial cost of construction is a penny-wise-pound-foolish policy as it penalizes the housekeeper by depriving her of economical and labor saving gas appliances which she needs and desires or else makes their later installation cost more than necessary. On the other hand, the installation of a modern cabinet range, good water heater, space heaters and other efficient devices adds greatly to the value—and salability—of the house.

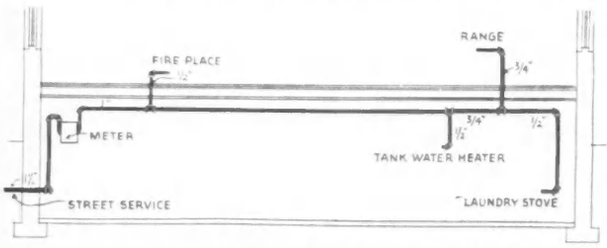
Providing Adequate Piping and Flues

Each year sees an increase in gas consumption per home, and that this rate of increase is growing faster every year is definite evidence that gas will eventually replace other fuels in the home, and undoubtedly this will include house heating as well as cooking, water heating and other more usual domestic uses of gas.

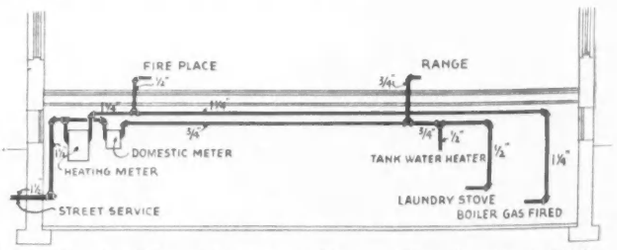
As home builders and homekeepers come more and more to depend on gas service they will require more and better gas appliances. The wise builder will therefore look to the future by providing in advance for the service and appliances which even in a few short years will be introduced into the homes. The two essential items under this head are proper piping and adequate ventilation. With these suitably provided, it will not require ripping up walls or floors to install the necessary piping for additional appliances.

Cost of Piping

The cost of gas piping, if put in at the time of erection, is relatively small when compared to the total cost of the building and compared to the increased rental value of the premises so equipped. This cost varies from 1/10 of 1 per cent to 1 per cent of the total cost of the building, the latter figure covering the mose elaborate piping layout required to cover every possible contingency. But if the piping has to be put in after erection due to demands of prospective tenants, which is a quite general case, the cost will be greatly increased, besides which the installation is liable to be unsightly and the work annoying and inconvenient to the occupants of the building.



No. 1. A Simple Piping Plan for a One Family Home, Showing (No. 1) Opening in Fireplace, (No. 2) Range, (No. 3) Tank Water Heater, (No. 4) Laundry Stove.



No. 2. A Piping Plan for a Home, Showing in Addition to the Domestic Equipment, a Separate Meter and Fuel Run for a Gas Fired Central Heating Plant. Note: Fireplace opening taken off of the heating line.

Size of Pipe

Under the heading "How to Calculate Pipe Layout," the method of arriving at the size of pipe needed for various requirements will be given. It is essential, however, that ample provision as to pipe sizes should be made at the start so that any unknown contingency of future occupation can be met as well as the known present needs.

How to Calculate Pipe Layout

The size of gas pipe necessary to install depends on the following factors:

(a) Length of pipe.

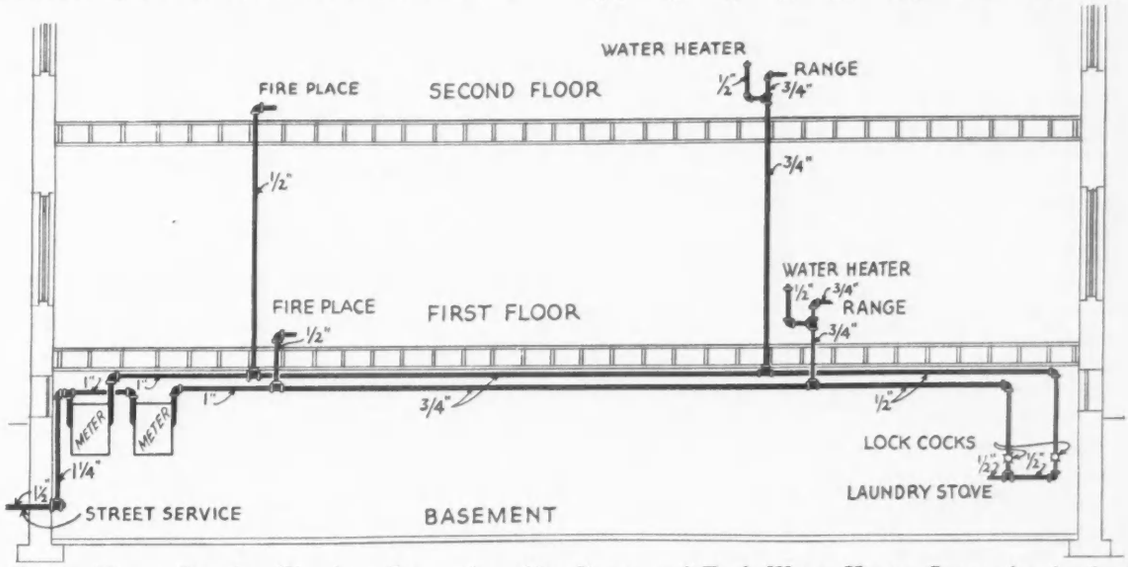
(b) Maximum gas consumption to be provided for.

TABLE 1

Showing Capacity of Pipe of Different Diameters and Lengths in Cubic Feet per Hour with Pressure Drop of 0.2 Inch and Specific Gravity 0.60.

To Be Used for Figuring Laterals and Service Pipes

Length of pipe, feet	Diameter of pipe, inches								
	¾	1	1¼	1½	2	3	4	6	8
15	168	350	620	960	2000	5400	11200	31000	63000
30	120	245	430	680	1400	3800	7900	21500	44000
45	98	200	355	530	1150	3200	6500	18000	36500
60	84	175	310	480	1000	2700	5600	15500	31500
75	76	155	275	430	890	2450	5000	13700	28000
90	70	145	250	395	810	2260	4550	12500	26000
105	64	132	232	370	750	2100	4200	11500	24000
120	60	125	215	340	700	1950	4000	11000	22000
150	54	110	195	310	630	1750	3550	9800	20000
180	49	100	175	280	570	1600	3200	8900	18000
210	44	94	165	260	530	1450	3000	8200	16500
240	43	88	155	240	500	1350	2800	7700	16000
270	40	83	145	230	470	1300	2650	7100	15000
300	38	79	138	215	440	1250	2500	6900	14000
450	31	64	112	176	360	1000	2050	5600	11500
600	27	56	97	152	315	860	1750	4900	10000



A Two Family Home, Showing Fireplace Connection, Also Range and Tank Water Heater Connection in the Kitchen of Each Flat.

(c) Allowable loss in pressure from service pipe to appliance.

(d) Specific gravity of the gas.

The specific gravity of most gases varies between .45 and .65, and as the capacity of pipe is only affected by this factor inversely as the square root, it is sufficiently accurate to use an assumed gravity of .6 for all calculations. Tables 1 and 2 are both based on this value but if it is desired to use the exact gravity for a particular condition, the values in the two tables can be corrected by multiplying by $\sqrt{\frac{0.6}{\text{Sp. gr.}}}$

The unit for measuring the pressure of manufactured gas is inches of water, and it will be noted in Table I that the gas capacities for the various pipe sizes are given for a .2-in. pressure drop. In Table 2 the drop allowed is .5 in. These two tables are given in order to compensate for the different conditions encountered in calculating lateral feed pipes as against vertical or riser pipes. Table 1 is for laterals and Table 2 for risers. There are two reasons which permit a greater pressure drop to be allowed on risers. First, the drop in pressure due to the ordinary friction loss is reduced by the gas column which is lighter than air and therefore causes an increase in pressure with altitude. For a gas with a specific gravity of .6 this increase is approximately 1 in. (of water) per 170 ft. of elevation.

The possibility of all gas appliances being in use at one time is remote, particularly on the different floors. A greater diversity can be expected when we include a variety of uses than when only one use is considered and a more liberal factor can therefore usually be allowed for risers than for laterals.

TABLE 2

Showing Capacity of Pipe of Different Diameters and Lengths in Cubic Feet per Hour with Pressure Drop of 0.5 Inch and Specific Gravity 0.60.

To Be Used for Figuring Verticals and Risers

Length of pipe, feet	Diameter of pipe, inches									
	¾	1	1¼	1½	2	3	4	5	6	8
15	270	560	980	1540	3200	8600	17800	31000	49000	100000
30	190	390	680	1080	2200	6100	12500	22000	34500	71000
45	155	320	560	890	1800	5000	10300	18000	28000	58000
60	135	280	490	770	1600	4300	8900	15500	24500	50000
75	120	250	430	680	1400	3800	8000	14000	22000	45000
90	110	230	400	620	1300	3500	7300	12500	20000	41000
105	102	210	370	580	1200	3300	6800	11800	18500	38000
120	96	200	345	545	1100	3100	6300	11000	17400	36000
150	87	180	310	490	1000	2700	5600	9800	15500	32000
180	79	160	280	445	900	2500	5100	8900	14000	29000
210	73	150	260	410	840	2300	4800	8300	13000	27000
240	68	140	245	385	790	2150	4400	7700	12300	25000
270	65	130	230	365	740	2050	4200	7300	11500	23500
300	61	125	220	345	710	1950	4000	7000	11000	22500
450	50	100	180	280	570	1600	3200	5600	8900	18000
600	43	88	150	240	490	1350	2800	4800	7600	15500

Miscellaneous Recommendation on Piping

Piping should not be laid under tile, parquet or mosaic floors, where it is at all possible to avoid it. Piping should not be run to bottom of beams that are to be covered with lath and plaster, but should be run along top of beams or joists, where it is possible, so that it will be accessible by raising the floor boards, which, when covering such piping, should be fastened with brass screws.

All parts of gas piping should be securely and permanently fastened to or supported from the building itself. If this is not done, sags or undue strains may later develop and the piping may leak or condensation may accumulate in the low points of the sags and interfere with the free flow of gas.

All piping should slope toward the meter, or outlet—condensation can then be renewed if necessary. Meters will not be set in places where they are exposed to damp

or frost or extreme heat. A "T" not "L" should be placed on cellar end of riser.

Flues and Flue Connections

In the design of buildings to contain gas burning appliances, the factor of ventilation should always be carefully considered. A properly designed appliance, operating under correct adjustment, will, when burning, produce only carbon dioxide and water vapor, both of *which are absolutely harmless.* It is necessary, however, in order that this condition be maintained, that sufficient ventilation be provided. If, therefore, large gas consuming appliances are to be installed in relatively small spaces, a flue or chimney connection is necessary. Further, gas appliances operating under automatic control should always be vented, as should all appliances installed in bathrooms. This practice should never be deviated from unless the room is very large and provided with exceptionally large window surface. In any event, consult your local gas company on this point.

In the case of individual room heaters for use in the various rooms, they can be operated safely without vent connections provided that they do not exceed the correct heater capacity (equivalent square foot rating) for each room. If they do not exceed this heater capacity, the heater or heaters can burn indefinitely in a room having approximately three air changes per hour without ever raising the carbon dioxide content to a proportion that will be in the least measure harmful.

Where flues and flue connections are necessary, these chimneys or flues should be of the same size as required for solid fuel appliances of equivalent capacity. As for design and material, the specifications of the National Board of Fire Underwriters should be followed. Smooth tile lined flues are very satisfactory for venting gas appliances.

The cases quite frequently found where makeshift vents for gas appliances have been installed are due to the fact that sufficient flues to care for the various requirements are seldom provided in buildings. As an example, every cellar should have at least two flue outlets, one for the heating boiler or furnace and one for the hot water supply heater. The American Gas Association urgently recommends the more general provision of flues in buildings and homes.

Installation of Appliances

All gas appliances should, wherever practical, be connected solid with iron connections. Plain rubber hose should in no case be permitted. Flexible hose, properly designed and approved by the proper authorities, may, in certain cases, be used; but where so used, a stop cock should be placed near the supply pipe.

Gas consuming equipment should be adequately supported so as to avoid strains on the piping, connections, and vents.

Gas burning equipment should be installed a sufficient distance from combustible materials of any kind to prevent the heat from the gas flame from raising the temperature of such materials above 160 deg. F. Ranges, water heaters and similar devices should be at least six inches, and preferably more, from an unprotected vertical combustible wall. Combustible shelves should not be closer than three feet above open gas flames.

Flue connection pipes should be kept at the distances given above from combustible surfaces, except that the vertical distance between such connections and combustible ceilings should be at least one foot.

Gas Line Cocks and Valves

Wherever flexible tubing is used there should be a valve or cock at the inlet end so that when the gas is not being used the cock may be closed and the tubing relieved of pressure.

Cocks controlling several outlets from a gas line should be placed at a sufficient distance from each other to avoid the probability of turning the valve at the wrong outlet and thus permitting gas to escape unburned. Such outlets should be placed in well lighted locations for ready access.

In buildings, line cocks in gas piping systems should always be used under the following conditions:

(a) Appliances of high rate of gas consumption such as house heating furnaces;

(b) Water heaters and other devices of the automatic instantaneous type;

(c) In apartment buildings where relatively frequent changes of gas ranges are likely to be made or where fixtures are fed from a gas line serving two or more apartments.

Ordinarily gas cocks of the quarter turn type are better than the hand-wheel valve type, because of the possibility of using a stop pin for the "off" position and observing quickly the extent of the valve opening.

For further data we suggest consulting your local gas company.

✣

Gas Association Competition

AN architectural prize competition is being conducted by the American Gas Association, 342 Madison Ave., New York City, in which architects, draftsmen and students in architectural schools throughout the United States and Canada are invited to compete. Nine prizes will be awarded, a first prize of $1,000, a second prize of $500, two prizes of $250 each, and five prizes of $100 each. In addition five plans will be selected for honorable mention.

The competition will be based on plans for a six-room house. In order that the designs may serve the widest possible public it will be assumed that the house will be built on a suburban lot 100 feet deep by 50 feet wide on the street and that the lot is practically level. The house may be built of any material but shall not contain more than 25,000 cubic feet and this latter point will be carefully checked.

Plans must include living room, dining room, kitchen, porch, a double bedroom, two single bedrooms, bath room and necessary closets, stairs and conveniences and may include a breakfast nook. Space must be provided in the basement for a gas fired heating plant and gas water heater and may be provided for such other gas appliances and purposes, such as laundry and play room, as the competitor may choose. The location of all gas appliances must be marked and numbered and a table included listing them.

The jury to award the prizes will consist of two members of the American Institute of Architects, selected by a vote of the competitors, and one representative of the gas industry. The competition will close on May 25, 1926. Complete information on the terms and requirements of the competition can be secured from The Architectural Advisor, care of the American Gas Association.

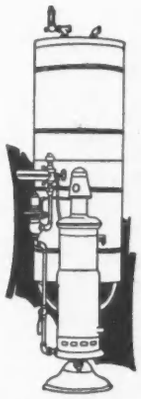
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Insulation and Gas Heating

AN article describing the home of Mr. H. S. Ashenhurst, of Chicago, was published in the January issue of AMERICAN BUILDER under the title "Insulation Scores New Success." This article told how through complete insulation it was possible to reduce the size of the heating plant to such an extent that the additional cost of the insulation was balanced and that it was estimated by heating engineers that the cost of heating this house with gas would be no greater than the cost of heating an uninsulated house with anthracite coal.

(*Continued to page 468*)

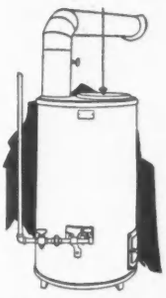
Increase Home Values by Installing Adequate Gas Equipment



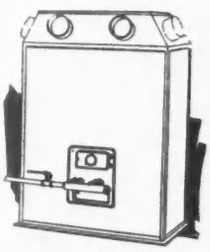
Water Heater



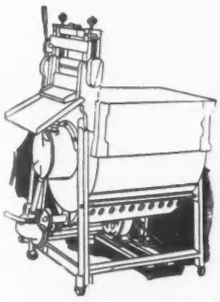
Laundry Stove



Garbage Incinerator



Warm Air Furnace



Heated Clothes Washer

PROVIDING FOR LATER NEEDS

Each year sees an increase in gas consumption per home, and that this rate of increase is growing faster every year is definite evidence that gas will eventually replace other fuels in the home, and undoubtedly this will include house heating as well as cooking, water heating and other more usual domestic uses of gas.

As home builders and home keepers come more and more to depend on gas service they will require more and better gas appliances. The wise builder will therefore look to the future by providing in advance for the service and appliances which even in a few short years will be introduced into the homes. The two essential items under this head are proper piping and adequate ventilation. With these suitably provided, it will not require ripping up walls or floors to install the necessary piping for additional appliances.

GREATER SELLING VALUE

In designing and building a home, builders (in an effort to keep down the initial cost) often provide the very minimum gas service and appliances—sometimes only a range, seldom more than a range and water heater. Even in selecting the types of ranges and heaters, the low price factor has been used as a guide. This effort to maintain a low initial cost of construction is a mistake as it penalizes the housekeeper by depriving her of economical and labor-saving gas appliances which she needs and desires or else makes their later installation cost more than necessary. On the other hand, the installation of a modern cabinet range, good water heater, space heaters and other efficient devices adds greatly to the value—and salability—of the house.

GAS—THE IDEAL FUEL

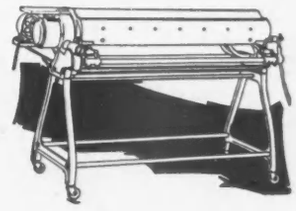
Gas is the cleanest, most reliable and most convenient household fuel for cooking, water heating and room heating as well as for other domestic uses. In nearly every case it is also the most economical fuel for these purposes. Among its chief advantages over other fuels are: freedom from smoke and soot, constant supply ready for any demand, simple control and ease of heat regulation, efficiency per dollar cost, no investment in fuel required previous to use, no ashes to remove, no dust or dirt to spoil the the paint, walls and furnishings.

The American Gas Association is now conducting an architectural competition for the design of homes providing for adequate gas equipment—appliances, piping and flues. Detail specifications for the prize winning homes will be made available to builders and contractors. Meanwhile the A. G. A. welcomes inquiries as to the details of gas equipment installation.

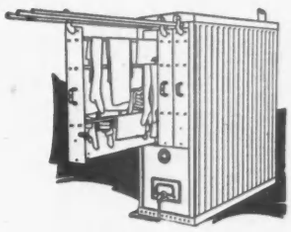
Provide piping and flues to allow all these appliances to be installed

AMERICAN GAS ASSOCIATION
342 Madison Avenue
New York

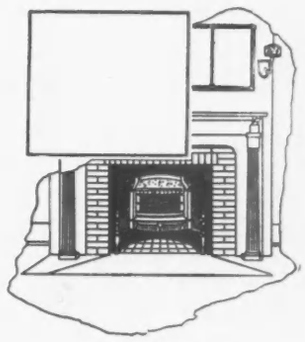




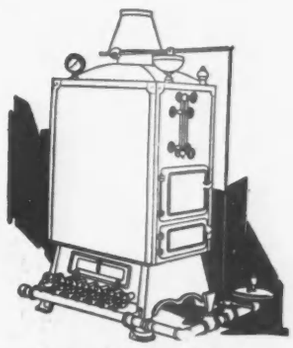
Clothes Ironer



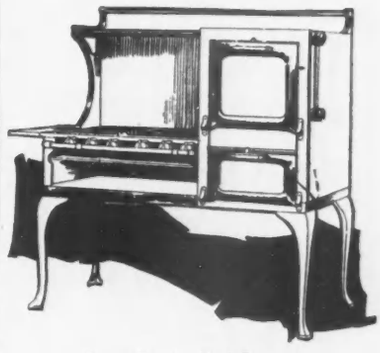
Clothes Dryer



Fireplace Heater



Steam Heating Boiler



Oven Controlled Range



Advantageous Features of the A-B Gas Range

Wilder Metal oven linings, guaranteed never to rust; smooth, easy-to-clean, genuine porcelain and baked enamel finishes; triple insulated, heat-retaining ovens; patented heat-centering, gas saving burners; ovens with full depth of 20 inches.

free

Every contractor, builder and architect should have a copy of "Modern Apartments." It is a valuable reference book showing the importance of demanding A. G. A. Specifications in gas ranges for homes and apartments. The book is free. Write for your copy now.



for 1926

~a Billion Dollar Home~ Building Program

The record-breaking volume of home building last year gives promise of being equalled, if not surpassed, in 1926. Statistics gathered from reliable sources justify the prediction that One Billion Dollars will be put into new apartment buildings and homes this year.

To the end that the modern home or apartment kitchen may be provided with good cooking equipment, A-B has mastered the task, through specialized facilities and great quantity production, of creating beautiful and highly serviceable Gas Ranges at exceptionally low prices.

That the A-B Gas Range is being specified with increasing frequency by well informed architects, builders and owners of so many of the country's most notable homes and apartments is a popular recognition of deserved leadership.

There's a type of A-B Gas Range to fit any home—apartment, bungalow, cottage or mansion. Write for literature.

A-B STOVE COMPANY—Battle Creek, Mich.

World's Largest Exclusive Manufacturers of Gas Ranges

A-B Gas Ranges

"Recognized Everywhere As America's Best"



"Lorain" Now Used by over 550 Schools

GAS RANGES equipped with the Lorain Oven Heat Regulator are used for cookery instruction purposes in the domestic science departments of over 550 of the leading schools and universities of America.

"Lorain" provides the one way to be certain that the gas range oven maintains a definite temperature for any desired period of time. The Red Wheel can be set at any one of 44 variations, over a range of 325 degrees of heat, and will hold that heat as long as desired—automatically

Because Lorain-equipped gas ranges guarantee perfect baking and cooking results, thousands upon thousands have been sold to housewives all over America. Each finds that "Lorain" makes cooking a pleasure. These remarkable gas stoves are found in thousands of apartment houses, homes, churches and hospitals.

There's a style and size for every requirement. Catalog and data on special Lorain equipment for schools sent on request.

AMERICAN STOVE COMPANY
Largest Makers of Gas Ranges in the World
1912 Chouteau Avenue St. Louis, Mo.

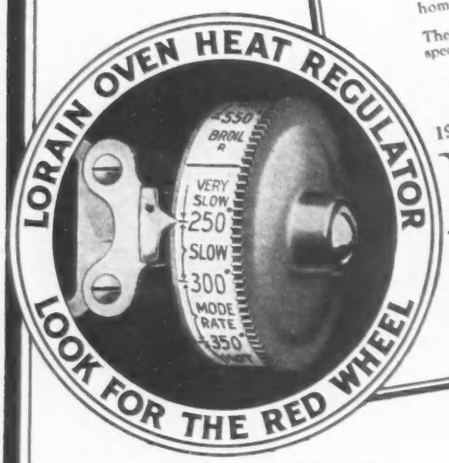
LORAIN
OVEN HEAT REGULATOR



One easy turn of the Lorain Red Wheel gives the housewife a choice of 44 measured and controlled oven heats for any kind of oven cooking or baking

Only these six famous makes of gas ranges are equipped with the Lorain Oven Heat Regulator:

CLARK JEWEL
NEW PROCESS
QUICK MEAL
RELIABLE
DANGLER and
DIRECT ACTION



Unless the Regulator has a RED WHEEL it is NOT a LORAIN

Now over 1600

EACH year, in over 1600 schools and colleges, thousands of young women are learning to cook with Lorain Self-regulating Ovens. Each month millions of housewives see the advertisements of the Lorain Red Wheel that appear in their favorite magazines.

Each week, more and more of these women are demanding, in new houses and apartments, kitchens furnished with Lorain-equipped Gas Ranges. No substitute will do. They know the RED WHEEL.

For sizes, styles and finishes see 20th Edition, Sweet's Catalog, Pages 2769-2778 or send for our *Handbook on Gas Ranges for Architects and Builders.*

AMERICAN STOVE COMPANY, 233 Chouteau Ave., St. Louis, Mo.



Type A Automatic Instantaneous Gas Water Heater. 6 Sizes—2 to 8 gallons per minute.



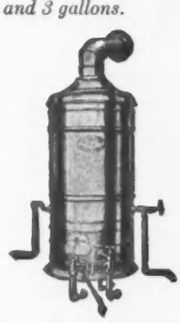
Cottage Automatic Heater. Three Types.



Acme Automatic Storage System. Moderate Price. Capacity, 24 gallons.



Automatic Heater (Pressure Valve Type). Capacity, 2, 2½ and 3 gallons.



Instantaneous Bath Water Heater. Capacity, 2½ and 3 gallons per minute.

One Thing Mr. Hoover Hasn't Standardized Yet

The American family. And until he does, you've got to keep on building homes of different sizes and capacities.

We're up against the same thing with Humphrey Automatic Water Heaters. You count *noses* and we count *taps.* We have to make enough types and sizes to take care of any number of taps in any sized home you build.

That's why we are compelled to manufacture 25 or 30 Humphrey Heaters instead of building one or two and calling it a day.

Our job in life is supplying *hot water in homes* —not merely selling heating devices.

We follow every Humphrey Heater into every home and stay on the job for twenty years or more without a let-up. That's one reason why we never recommend a *misfit* that can't possibly give full-volume service at reasonable cost.

There's a Humphrey Automatic Heater of just the right type and capacity to give good service in any home under any conditions. We will be glad to make surveys and recommendations for you at any time.

There's one thing you can always be sure of when you equip your homes with Humphreys—the highest value at a price that is moderate and fair—and this means *cheapest in the long run.*

It costs only a few cents a day to own and operate a Humphrey Automatic Heater and enjoy instantaneous, full-volume service over a period of 20 years or longer.

Write for new book of facts giving detailed instructions and diagrams; specifications and methods of determining sizes for various requirements. Valuable data for any builder.

HUMPHREY COMPANY
Kalamazoo, Mich.
(Div. Ruud Mfg. Co.)

HUMPHREY
Automatic Gas Water Heaters



Instantaneous Shower Bath Heater. Bath Heater and Shower Complete.



Copper Coil Tank Water Heater. Three Types: 30 to 80 gallons capacity.



Humphrey Automatic Storage System. Three Sizes: 24, 40 and 66 gallon capacities.



Humphrey Multi-Coil Automatic Storage System. For office buildings, hospitals, hotels, etc. Can deliver in any capacity desired.

Selling for the Builder—

"In the same apartment building I installed both Kab-Ranges and fine quality ranges of ordinary type. The apartments with Kab-Ranges rented much more quickly and with surprisingly less effort."

—The Name of This Builder Will be Sent on Request.



The New KAB-

Combination Range and

The blank below is for your convenience in requesting prices and specifications!



AB-4

THE OHIO STATE STOVE & MFG. CO.
COLUMBUS, OHIO

Name_____

Address_____

City_____ State_____

Saving for the Builder—

"By equipping my apartment kitchens with Kab-Ranges I have found it possible to effect a space saving worth $1.75 to $3.00 a month for each kitchen, basing my figures on the prevailing scale of rentals."

—A prominent New York Architect and Builder.

Successful builders are defeating competition with Kab-Range

AMERICA'S standard of living is going up—but rents and prices for *ordinary* homes and apartments are not. Competition is abroad—a competition that cannot be met by cheapness. The public wants both economy and ultra modern convenience. Now, look at Kab-Range. It speaks for itself, to the woman who influences all sales and rentals, to the builder who knows that she does.

What Kab-Range Does

Kab-Range in the kitchen says to the house-wife: "Three times a day I will save you extra time and energy that you can use for pleasanter things than cooking. I will keep your kitchen cleaner, neater and more attractive. I will make you the envy of your friends and I will help to keep you young. I am the mark of a modern dwelling."

To the builder Kab-Range says: I will save you costly space and be a powerful help to you in selling and renting. I am simple and practical, yet I meet modern conditions and improve them. I cost much less than a separate range and cabinet. I will help you to *defeat* competition this year."

Kab-Range Stands Alone

There is only one Kab-Range. It cannot be successfully imitated because it is the only combination of range and kitchen cabinet that insulates oven heat from the food compartments below. This feature cannot be copied. It is beautiful in spotless nickel and enamel and it is built in different sizes and finishes for every requirement. A few typical installations (apartment buildings) are: Sommer Arms, Brooklyn; The Lewis Morris, New York City; Magnolia Court Apts., St. Louis; Broadview Apts., Chicago; Charminel Apts., Columbus; Grassmay Apts., New Rochelle; Studio Apts., Minneapolis; 183 Pinehurst Ave., New York City.



Equipped with Kab Range

THE OHIO STATE STOVE & MANUFACTURING CO.
GENERAL OFFICES AND FACTORY—COLUMBUS, OHIO, U. S. A.
New York Office and Display—42nd and Lexington
Chicago Display—666 Lake Shore Drive

RANGE

Kitchen Cabinet for Modern Homes and Apartments

5 Gallons of Hot Water ~ for the Price of One

Made Possible by a New Oil Burning Principle Which Only Piatt Can Use

RUNNING HOT WATER is no longer limited to city dwellers. Piatt removes the restriction which gas heaters have hitherto imposed, and brings the vitally desired conveniences of running hot water to the gas-less country and suburban building.

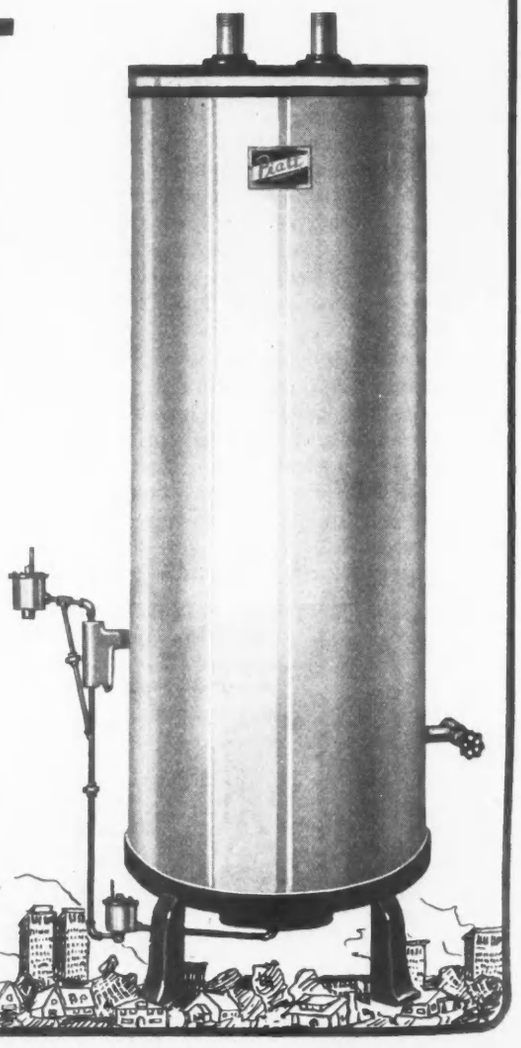
The Piatt is unlike any other oil-burning water heater you have ever seen or heard about. It uses the same oil burner that has been used for 4½ years by the U. S. Government—it is not experimental in principle or practice.

No wicks to trim. No fuel to pump. No priming. No attention. No watching. No work. No danger. Entirely and continuously automatic. As long as there's fuel at the tank there'll be hot water at the faucets—an inexhaustible supply, day and night, summer and winter—

And at a saving of 80% to 89% in fuel cost, compared to the use of gas.

PIATT

AUTOMATIC WATER HEATERS



Piatt makes the world's most complete line of water heaters. For every hot water need there's a heater of the correct size and type, either a Piatt for oil or a Bailey for gas. Small homes or large apartment buildings—country estates, hospitals and sanitariums, resort hotels, factories, farm homes, country clubs—wherever the building and whatever its type; and whether or not it is gas-connected, there's a Piatt for the purpose.

Every Piatt Water heater is sold, installed and serviced through direct factory representatives. The sweeping Piatt guarantee provides for *lifetime* satisfaction.

Plan an oil-burning Piatt when you plan for domestic water supply. Write for "Pioneers,"—an illustrated catalog on the complete Piatt line. Building contractors are urged to get details of an interesting dealer proposition.

Piatt Water Heater Company

Manufacturers of

BAILEY Automatic Water Heaters (*gas*) | PIATT Automatic Water Heaters (*oil*) | THERMOSEAL Water Heaters (*gas*)

LANSING, MICHIGAN





Acquitania Apartments located at Argyle St. and Lake Michigan.
83 apartments equipped with Roper gas ranges.

ROPER
Complete Oven Control



It pays them—it pays you

Farsighted builders and apartment owners see in the Roper more than a gas range. They know that the reputation of the Roper adds character to their buildings—they know that prospective tenants are powerfully attracted by a well equipped kitchen—they take advantage of the fact that a woman who has once enjoyed the convenience of Roper Complete Oven Control will hesitate to leave an apartment which has it for one which does not.

Install Roper gas ranges in your new apartments and you attract better tenants—sign your leases more quickly—hold your tenants longer—and rent your apartments at a larger profit. Roper gas ranges are made by the oldest gas range manufacturer in the business—they are being nationally advertised to 48,925,855 readers in 1926. They are used in the best homes of the nation. To know their beauty, convenience and economy, write today for complete catalog.

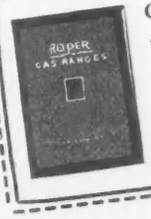
GEO. D. ROPER CORPORATION, *Rockford, Illinois*
Pacific Coast Branch: 135 Bluxome St., San Francisco, Cal.

ROPER
GAS RANGES
TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA

BE SURE THE ROPER PURPLE LINE ▬ AND THE ROPER COMPLETE OVEN CONTROL ARE ON THE GAS RANGE YOU BUY

Mail Today

A.B.-4



GEO. D. ROPER CORPORATION
Rockford, Illinois
Please send me your 1926 catalog.

Name _____

Address _____



The *Preferred* Plastic Magnesia Stucco *waterproofed*

PLASTIC MAGNESIA

This Permanently Waterproofed Magnesia Stucco Assures Lasting Beauty

ELASTICA is the oldest plastic magnesia stucco in continuous use. And the homes built with it increase in number each succeeding year.

Elastica is thoroughly and permanently waterproofed with an integral all mineral waterproofing. It is, therefore, not affected by water and climatic changes. Nor can water penetrate it. Elastica protects the lath or background.

Contractors everywhere use Elastica and have been using it for years. They find that one job recommends another, assuring a greater volume of business. And also that Elastica is easily and quickly applied, saving money in application.

Judge Elastica by its record. Ask contractors who know and use it. We will gladly give you names. Submit Elastica to the severest tests. You can know definitely before you use Elastica or recommend it what to expect of it.

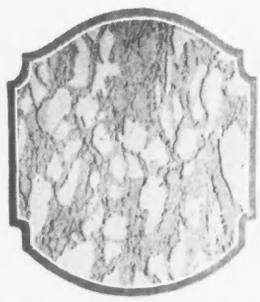
Manufactured by

U. S. MATERIALS CO., Chicago AMERICAN MATERIALS CO., N. Y
NORTHWEST MATERIALS CO., St. Paul

ELASTICA

THE WATERPROOFED STUCCO

© U. S. Materials Co., July, 1924



Variety—Almost every conceivable troweled effect may be obtained with Elastica. It is adapted to the widest variety of architectural designs from the typically American rock dash surface to the Spanish, Italian, Old English and other colored troweled surfaces. Let us send you samples and our new booklet on Elastica French Finishes, together with reproduction in colors of attractive surfaces. The design above is the oak leaf.



MAKE THIS TEST

Take a sample of one of Elastica's first or second coats from any building under construction or from any dealer's stock and make your own samples. Or you may get them direct from the factory on request. Allow the sample to set for two weeks or more. Then immerse it in water or apply water to it. Make the same test with a sample of any ordinary stucco obtained in the same way. Then break both samples and note that water has not penetrated Elastica. Drop water on the exposed broken edges and again note that it will not penetrate the Elastica sample.

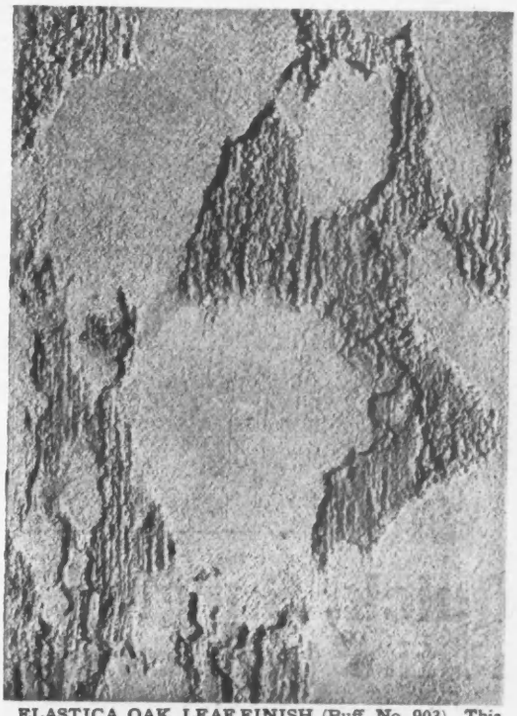
ELASTICA STUCCO FINISHES

FOR INTERIORS AND EXTERIORS



ELASTICA SPANISH FINISH (Gray, No. 1007). An excellent example of the distinctive troweled effects achieved through Elastica French Finishes. Obtainable in any standard color.

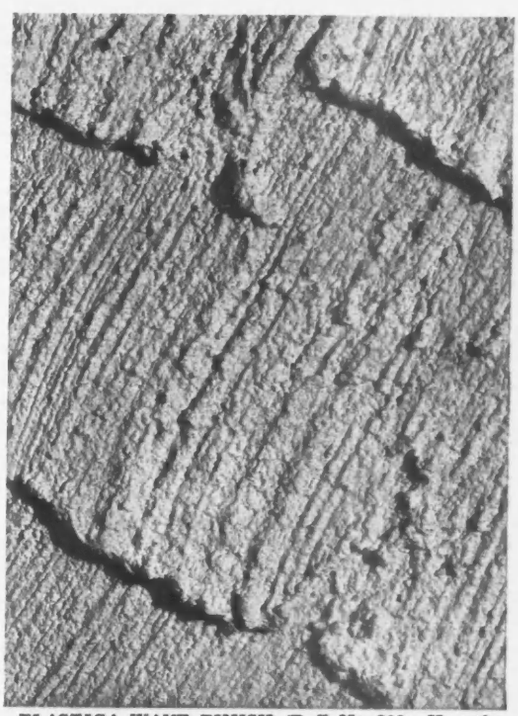
ELASTICA French Finish



ELASTICA OAK LEAF FINISH (Buff, No. 903). This leaf-like design is exceptionally attractive and is available in any standard color.



ELASTICA ROUGH CAST FINISH (No. 706). Particularly popular where California-type bungalows and other antique architectures are selected. Available in all standard colors.



ELASTICA WAVE FINISH (Buff, No. 908). Here the sweeping, rippling effect of waves are trowel-sculptured in stucco. Unusually pleasing. Highly original. Available in any standard color.

Here is stucco in its most expressive and most colorful moods—the new Elastica French Finishes. These beautiful Elastica finishes are sweeping into rapid popularity all over America. Used according to specifications, they are applied over two coats of Elastica. And Elastica is thoroughly and permanently Waterproofed—insuring lasting satisfaction. They are factory-mixed and factory-colored—therefore provide positive uniformity of color. Shipped "Complete in a Sack."

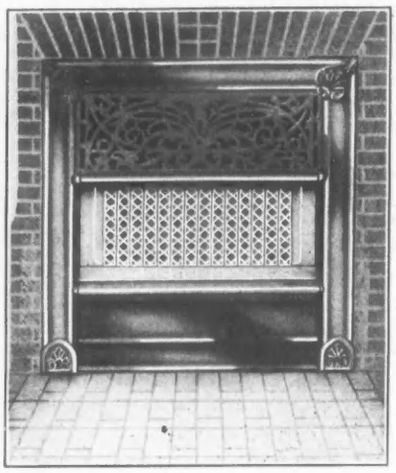
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MANUFACTURED BY

U. S. MATERIALS CO., Chicago AMERICAN MATERIALS CO., New York
NORTH WEST MATERIALS CO., St. Paul

Guardian

FIREPLACE AND PORTABLE HEATERS



Quick, Surging Heat at the turn of a valve

Here is cozy comfort at the cost of a few cents daily. The Guardian provides ample heat for spring and fall days, and is a wonderful winter asset for any home.

Easily installed, economical to operate, reasonable in cost. The attractive No. 14-24 Guardian illustrated in only one from a complete line of heaters that meet every need. It is one of our famous "Air Circulating Type" heaters that have built such a wonderful reputation for Guardians wherever gas is used.

No matter whether you plan to built for yourself or build to sell, you will find a Guardian will increase the salability of any house. Send for handsome illustrated folder giving sizes, measurements and showing all styles.

Guardian

ODORLESS INCINERATORS

Don't pail your garbage— BURN IT!

Not much use building a high grade sanitary home unless you provide a modern means of garbage disposal. The Health Guardian can be installed in basement or kitchen. It is convenient, odorless, and entails no extra flues or other expenses. Can be installed at very little cost.

Burns wet or dry garbage and quickly reduces a bushel of garbage to a pint of sterile ash.

Built for permanence and finished in black or grey baked on enamel. Portable or wall types. Endorsed and approved by foremost authorities. Write for illustrated folder giving complete information.



The Guardian Gas Appliance Company

1364 East 47th St. Cleveland, Ohio

(Continued from page 456.)

After more than half of the heating season had passed Mr. Ashenhurst was able to make a statement as to his actual experience in heating this house, which attained the expectations. The heating plant is of the four burner type, each burner consuming 40 cubic feet of gas an hour. In order to determine the efficiency of a single burner, one burner was turned on early in October and maintained an even temperature of 70 degrees in the house even when the outside temperature went as low as 35 degrees. In maintaining this temperature the water in the boiler was never heated to an excess of 110 degrees.

A second burner was turned on when the outside temperature went down to 35 degrees and the two burners maintained an even temperature of 70 degrees even when the outside temperature went as low as 16 degrees below zero. In accomplishing this the water was never heated above 140 degrees. On the coldest days a third burner was turned on for about an hour in the morning to bring the temperature up to the 70-degree mark, after which it was turned off once more.

Two very striking points were shown by tests made during the winter. One of these showed that the average difference between the floor and ceiling temperatures was about 4 degrees as compared with a difference of 16 to 18 degrees in uninsulated houses. The second point was that the humidity never fell below 40 and sometimes went as high as 49. This was undoubtedly due to the fact that the even temperature and lack of leakage did not demand great quantities of very hot air being sent into the rooms.

With gas costing 75 cents a thousand feet, even in extremely cold weather the gas bill only ran a little over $1 a day and the cost of heating for the entire season, as based on meter readings so far, will only amount to about $180.

✣

Standardized and Grade-Marked Lumber Wins Support

SOME interesting facts concerning the seven months' campaign in the field for promotion of Secretary Hoover's national program for standardized and grade-marked lumber, conducted by the Southern Pine Association, are contained in a report to Secretary-Manager H. C. Berckes by members of the association's field staff.

A total of twenty-five general meetings of the lumber and building interests were held in the more important cities east of the Rocky Mountains during this campaign. The attendance at these meetings ranged from 125 to 700, the average attendance being about 250. The guests included lumbermen, architects, contractors, engineers, realtors, building and loan officials, purchasing agents, members of the press and others interested in building in the various communities. In each of the cities the meetings were held under joint auspices of the local retail lumber dealers and the Southern Pine Association.

At all of the meetings splendid enthusiasm was displayed over the movement and every gathering adopted emphatic resolutions endorsing the standardization and grade-marking program and pledged the aid of those present toward establishing it in their respective communities. There was little if any opposition manifested toward the movement and this consisted chiefly of objections or doubts concerning some minor phase of the program.

✣

Course in Concrete Control

A COURSE on the design and control of concrete mixes in the field was recently conducted in Detroit, Michigan, by J. W. Kelly, of the Structural Materials Research Laboratory, Lewis Institute, Chicago.

HOMES—
More Attractive—More Readily Sold with *EverHot Service*

Few household appliances add so little to the cost of a home as the EverHot Water Heater—

—None make a more important contribution to its attractiveness—to the comfort and satisfaction of those who live in it—or to its appeal to buyers.

The reason is obvious—EverHot water service assures an abundant supply of steaming hot water at any hour of the day or night. So simple is the construction of the heater and so amazingly efficient is its operation, that trouble is virtually unknown to EverHot owners and gas consumption is extremely low.

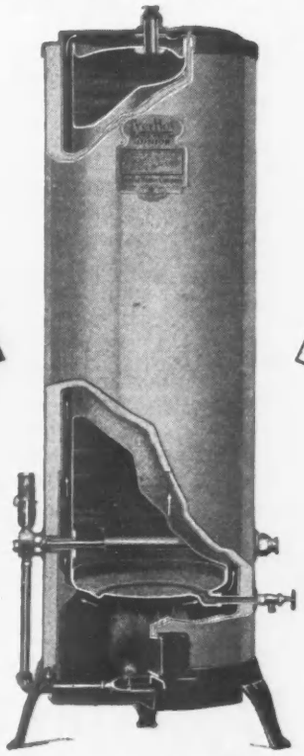
To plan and build an attractive home—no matter how moderate the cost—and then to equip it with any less efficient or satisfactory hot water system is simply to place a needless handicap on both seller and owner. There is no economy in doing without an EverHot—the price is paid in slower sale to the builder and in discomfort to the owner.

The number of contractors, builders, architects and plumbers who have chosen the EverHot for their own homes is, in itself, conclusive proof of the superiority of this heater.

Decide now to consider no home complete until EverHot is written into the list of appliances specified.

EVERHOT HEATER COMPANY, 5203 Wesson Ave., DETROIT, U. S. A.





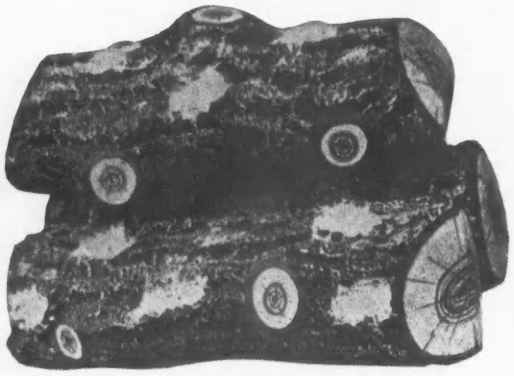


EverHot Baby Grand (for the very small home)—$66.
EverHot Junior (for the average home)—$88.
EverHot Senior (for the large home)—$139.
(Installation extra)

The tiny pilot light keeps a tankful of water EverHot. Main burner (thermostatically controlled) ignites only to replace hot water drawn off. Every inch of boiler surface is heating surface. Highly efficient insulation prevents heat loss.

EverHot
AUTOMATIC
WATER HEATER

(321)



Beautiful
GAS LOGS

No home or apartment is complete without a fireplace, and no fireplace is complete without Gas Logs.
Our logs are most realistic in appearance and burn without odor or noise. Made in from 1 to 4 stick sizes, and up to 36" in length.

The Monarch
ODORLESS GAS HEATER

is equipped with our patented *Automatic Air Mixer.* It produces a wonderful volume of heat and is easily the most practica and up-to-date gas heater on the market.
Write for our circular and prices. One installation will prove to you that our products are far superior in appearance and performance.

OTTO E. HANSEN & SONS
Perth Amboy, N. J.

BURFO
and
AJAX

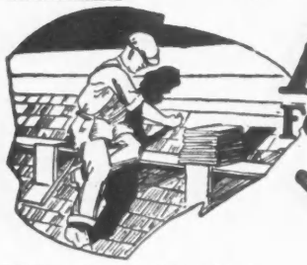


The
BURFO
SLATE CUTTER,
PUNCH
AND HAMMER

Saves Time and Slate

PATENTED

Cuts and Punches
Slate or Asbestos Shingles
Without Waste or
Breakage



AJAX
Folding Metal
Roofing
Bracket



THE QUICKEST
EVER AND AS SAFE
AS THE EARTH UNDER
YOUR FEET.

MANUFACTURED BY
AJAX BUILDING BRACKET CO.
1551 Rydal Mount Road, Cleveland Heights, Ohio

Radiator Loads Guaranteed

THE United States Radiator Corporation, Detroit, Mich., has announced a new policy of guaranteed radiation loads for its boilers. The cast iron radiating surface that each boiler will heat is named and is guaranteed in writing. The guarantee is based on a free burning coal not smaller than nut size and with a heat value not less than 13,000 B.t.u. When less than 13,000 B.t.u. fuel is used the recommended size of boiler is to be multiplied by a corresponding factor.

✣

New Disston Knife Factory

A MODERN machine knife manufacturing department has been added to the branch factory of Henry Disston & Sons, Inc., Sixth and Baymiller Street, Cincinnati, Ohio. This branch factory will serve users of Disston machine knives in the Middle West and parts of the South as it is now serving users of Disston saws in these territories.

✣

Heltzel Representative Named

THE Heltzel Steel Form & Iron Company, Warren, Ohio, announces the appointment of Chadwick Bros. Company, 25th and Clybourn Streets, Milwaukee, Wis., as its representative on steel sidewalk forms, curb forms, curb and gutter forms, etc., in the state of Wisconsin.

✣

An Electrical Home Complete

(*Continued from page 446.*)

The rear one has 12 windows in groups of four, each a single pane of glass about 30 inches square, with "Pullman car adjustment" as the builder phrased it. That is, the single sash may be lowered between the walls, the sill on hinges covering its disappearance. This is not an expensive idea, he asserts, and it is a vast improvement over the in-swinging or out-swinging casements as it takes up no room whatever, cannot be banged by a draft, and gives absolute protection against a driving rain. As these window-groups are placed rather high, the room has all the cross ventilation of the best sleeping porch. The arrangement, too, permits an unusually pretty drapery effect, with one long frill of color running along the top while fine dotted net screens the glass itself.

The bathroom plan reserves a special corner for the shower and its tiny window for air and light when the heavy curtain is drawn. All the closets are carefully planned, with an outer window to all save that for linen. Each bedroom has its own call-bell and telephone connection, the owner's idea being perfect comfort and self-service, giving communication between the rooms without the need of messengers. The alcove-den off the living room, at one side of the hospitable chimney, might be omitted, but it provides a cozy nook for reading, music or radio or sewing.

The kitchen has its electric stove, dishwasher and ice-making refrigerator as well as all the small electrical devices that add immeasurably to modern living. Without them and the expensive finishings the house might be built quite inexpensively and still be a most satisfactory home for a small family. Or, as with most of us, place may be made for these to be added as we felt able to afford more comforts and luxuries.

This attractive house was advertised by its architect, R. M. Finlayson, of Sierra Madre, California, as "the electrical home" and the public had the joy of going through it in search of information—a practical demonstration, as it were, in the latest "models."



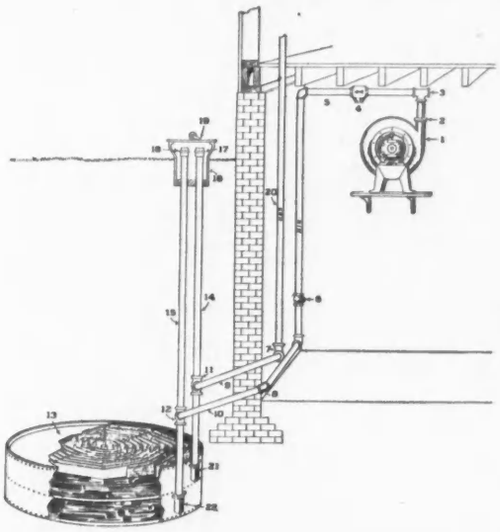
EDWARD MOORE
Palm Beach, Fla.



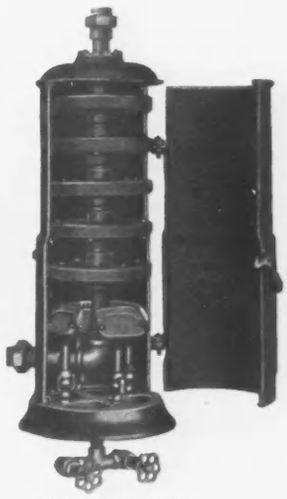
LINCOLN CONSOLIDATED SCHOOLS
Branch Michigan State Normal
Whittaker, Mich.



F. T. SULLIVAN
Fayette, Ohio







WATER HEATER

CITY COMFORTS for SUBURBAN BUILDINGS

OWNERS — DEALERS — BUILDERS

The convenience of gas is a necessity in suburban homes and buildings. The Clark Gas Producer is always chosen by worth while builders and owners because it produces results. Think of this—it offers the convenience of city living minus all troubles and worry. None can afford to overlook this unusual opportunity. Many installations have been working satisfactorily and continuously for more than thirty years. Owners get ease and comfort—dealers make big money—builders produce universal satisfaction by specifying Clark Gas Producers. The gas you do not have to generate—instant heat.

We desire active dealers in open territory and solicit inquiries from builders and prospective owners everywhere.

SUBURBAN HOMES, SCHOOLS, COLLEGES, HOSPITALS, CLUBS, INDUSTRIAL LABORATORIES

CLARK GAS PRODUCER

American Heating & Lighting Co.
Morenci, Michigan

Takes Drudgery Out of Estimating

Accurate Costs of Most Buildings Can Be Secured in from 30 to 50 Minutes by Using the HoltBid Method of Estimating

By JOSEPH D. EDDY

MEMBERS of the building industry are abandoning the old-fashioned method of estimating building costs. The drudgery of working over long columns of figures, and devoting one or two days to an estimate and then being doubtful about its accuracy are things of the past. They are adopting the HoltBid Method of estimating and find that it is easy to learn, easy to use, that their estimates secured by this method are accurate and that they can arrive at the cost in from 30 to 50 minutes.

Users of the HoltBid Method are enthusiastic about it. O. J. Bambach, of Bambach Bros., Rogers, Ark., recently adopted the HoltBid Method. After using it he wrote:

I want to take this opportunity of telling you that I am a HoltBidder and would not take the price of the whole set of instructions for the HoltBidder's Key alone. It is a master key for the estimator and has certainly taken the work out of estimating for me.

Mr. Bambach is an up-to-date business man. He has found something that will save him time and hard work, which means a saving of money. He read about the HoltBid Method and investigated. His letter tells what it meant to him to be willing to adopt this modern method of securing estimates of building costs.

Out on the Pacific Coast, E. T. Robie, president of the Auburn Lumber Co., Auburn, Calif., uses HoltBid. Mr. Robie says:

Where we have itemized a material bill after using HoltBid and compared the two, we have found HoltBid accurate. It saves a lot of time.

And this from the Atlantic Coast: A. A. Pennock, treasurer of I. F. Pennock & Son, Inc., Littleton, N. H., writes:

I am convinced that HoltBid is absolutely reliable. It is not hard to learn. In the beginning I was skeptical, as I could not see how it could fit different localities. Now I save hours of hard, tiresome work in estimating that has been my previous experience.



HoltBidders Are Not Tied to the Desk. They Have Time for Recreation.

F. O. Henkel, manager of the Alexander Lumber Co., Minier, Ill., is another progressive member of the building industry. Mr. Henkel, too, has adopted the modern HoltBid Method of estimating, and here is what he says about it:

We think the HoltBid is the most wonderful system in the world. I sold a job for $3,700 at a good profit that I would not have sold had I not used the HoltBid Method.

There are hundreds of other members of the building industry who have become HoltBidders recently. They are just as enthusiastic about HoltBid as the men whose letters are quoted above.



The Old-Fashioned Method of Estimating Is Drudgery.

It was this enthusiasm over HoltBid among members of the building industry that determined William A. Radford, president and editor-in-chief of AMERICAN BUILDER Magazine to take over the HoltBid Service Co. and move it to the headquarters of the Radford organization, 1827 and 1901 Prairie Ave., Chicago. A. W. Holt and his staff of HoltBid experts are now located at this address and are helping those who have recently adopted the HoltBid Method to become efficient HoltBidders. Mr. Holt and his associates are ready to render every service to those who are learning this method by which the estimate of cost of most any building can be secured in from 30 to 50 minutes.

When he became the president of the HoltBid Service Co., Mr. Radford determined that his method of estimating should be made available to every member of the building industry. He set a low price on the HoltBid method and made the terms so easy that no one need hesitate to become a HoltBidder. The response was immediate. HoltBid was proven a success.

Such endorsements as these quoted should leave no doubts in the minds of those who are estimating building costs about the great value of the HoltBid Method. They owe it to themselves to become HoltBidders. Elsewhere in this issue of the AMERICAN BUILDER Magazine will be found a four-page announcement in colors that explains what the HoltBid Method of estimating is and how easily it may be secured.



The Attractive Avondale Home *of* Mr John Beck
3938 Red Bud Ave. Cincinnati, O.



ANOTHER
RYBOLT
FURNACE

The Most Satisfactory Heating System *for* Homes *of* All Classes

Thousands of successful contractors recommend and supply Rybolt Warm Air Systems for houses which they build, to the great satisfaction of the owners.

Even the larger and more pretentious homes for which at one time nothing but steam or hot water would have been considered, now are made thoroughly comfortable in winter by means of convenient, clean, economical Rybolt Warm Air Systems.

Rybolt installers everywhere are closely co-operating with contractors, not only planning and installing the heating equipment, but also assuming full responsibility for its satisfactory operation. We have a splendid proposition to offer in communities where we are not represented.

Write us for particulars if interested.

The RYBOLT *Heater Company*

ASHLAND - - - OHIO

Branches

CINCINNATI INDIANAPOLIS

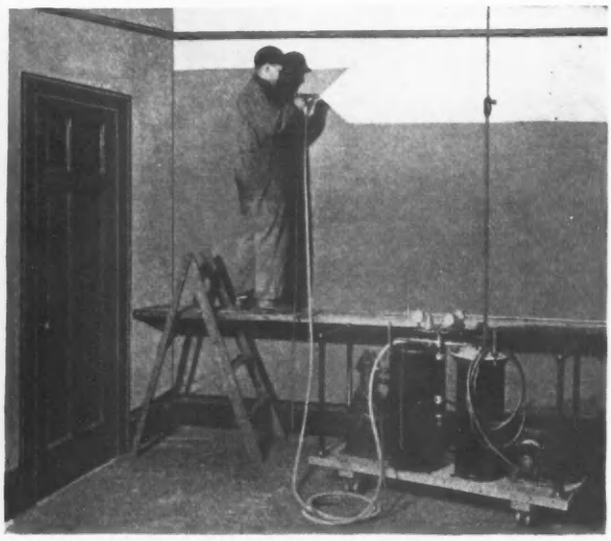


WHAT'S NEW ?

EDITOR'S NOTE: *The* AMERICAN BUILDER *does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or seller of any article we describe. This information is, however, kept on file and will be mailed to anyone interested; address* AMERICAN BUILDER *Information Exchange, 1827 Prairie Ave., Chicago.*

Complete Spray Painting Unit

A PORTABLE unit for applying paint, lacquer or paint remover comes absolutely complete and ready for use. It requires no delay or expense for installation when received, and can be operated from any lighting circuit. It can be used to advantage by the interior decorator, house painter or calciminer.



This Complete Unit for Applying Paint Lacquer, or Paint Remover, Is Mounted on a Truck on Four Casters, Making It Easily Portable.

This unit consists of a one-horsepower motor with 25 feet of cord and plug, a 3 by 3½-inch air compressor, belt, automatic belt tightener, sliding base for motor, air tank, pressure material container for paint or paint remover with necessary fittings, air spray gun with feed cup, 20 feet of hose with fittings for gun, pressure reducing valve, oil and water extractor, all pipings, fittings, safety valve and gages. The unit is mounted on a substantial truck on four casters so that it may be easily put into place where needed.

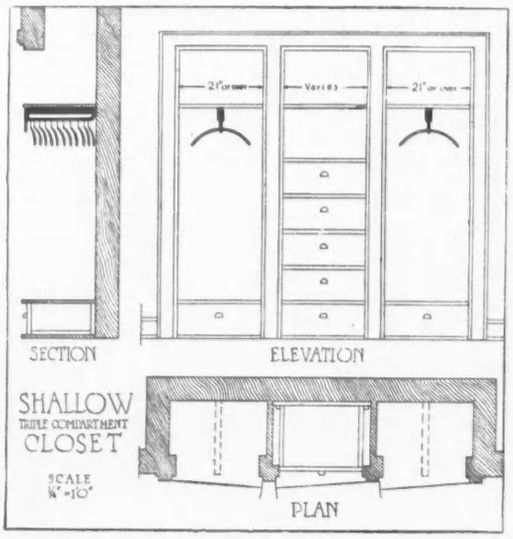
For paint removing this unit is equipped with double length of hose, 17 feet long, and chemical spray nozzle. These fittings may be readily substituted by fittings for paint or lacquer spraying with pressure material container when desired.

✣

For Smaller and Better Closets

A PIECE of equipment which is calculated to radically change the design of clothes closets is an extension garment carrier which doubles the closet capacity in half the space and permits larger rooms or a reduction in the size and cost of building. It also saves the clothes from the damage done by hanging on ordinary hooks and they may be brought out into the light and air for easy and convenient selection by a mere touch of the hand.

This carrier is furnished in all sizes from 15 inches up and is simply and strongly made and attractively finished. It fastens with screws under the closet shelf or to the door casing and back wall and rolls out on its track without effort.



The Sketch Shows How This Garment Carrier Makes Possible a Highly Condensed Closet Space With an Increased Capacity.

The manufacturers of the carrier offer a plan service for the design of closets and by the use of sliding shelves and drawers provide a shallow closet, with a depth of from 15 inches up, which forms a complete wardrobe.

✣

Bronze Face Mail Boxes

BUILT-IN mail boxes are a marked improvement over the old flimsy type of mail box tacked up beside the entrance, both as to appearance and the protection which they give to the mail. Boxes like the one illustrated are made in types to fit horizontally and also vertically, for narrow spaces and for every type of construction, including masonry, brick, concrete block, brick veneer and frame. It is also made in off-set shape for added protection of mail.

The face is of strong solid bronze and the receptacle of galvanized iron. The receptacle is reached from the inside of the house through a neat, hardwood, interior door. There are styles providing a place for street numbers and name plates.

These boxes meet all post-office regulations for residences, bungalows, duplexes, flats and multiple dwellings in which each family has its separate entrance from the street.



A Mail Box Built Into the Wall of the House Is a Marked Improvement Over the Old Type of Box.

(*Department continued to page 484.*)

protected!



Treasure dug from a lake!

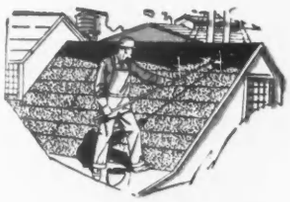
Trinidad Lake Asphalt has been used for a quarter-century in manufacturing prepared roofing. Dug from the surface of Trinidad Lake with mattocks—the passing years have not diminished nature's supply, nor dimmed its fame as the superior waterproofer. It is one of the important elements responsible for the wonderful success attained by the whole line of Genasco Roll Roofings and Shingles.

Other Genasco Products are listed below. Write us for complete information.

Genasco Asphalt Putty (Roofing Cement)
Genasco Insulating Paper
Genasco Deadening Felt
Genasco Red Sheathing Paper
Genasco Wall Lining

The Barber Asphalt Company

New York Chicago Pittsburgh **PHILADELPHIA** St. Louis Kansas City San Francisco



Genasco Roof Coatings

It helps smooth surface roll roofing to have an application of roof coating every two years—helps to preserve its water-proofing qualities, helps to prolong its life.

Genasco Roof Coating is a heavy black liquid asphalt. It dries to a tough elastic coating. Ready to use, in 1 and 5 gallon pails, and 50 gallon drums.

Genasco Asphalt Fibre Coating contains asbestos fibre. It permits a much heavier application—which will not flow in hot weather. In 1 and 5 gallon pails, 30 and 50 gallon drums.

Genasco Sealbac Shingles

Genasco Shingles, while made in different sizes and shapes, are all of the same high quality. The straight conventional Genasco Sealbac contain the same superior materials as Genasco Latite Shingles, including the famous Genasco "Sealbac" feature. Individual and strip. Individual in three colors—red, green, and blue-black. Strip in same three colors, and multicolor.



Genasco Stucco Base

Windproof, waterproof, rust-proof and vermin-proof. That's why Genasco Stucco Base is so desirable for use with Portland Cement and Magnesite Stucco, and it is economical besides—requires a minimum of stucco, and saves time and labor in applying. Made of high-grade felt thoroughly saturated and coated with asphalt in which granules of calcite are imbedded to act as a "key" or "anchor." 36-inch wide rolls—each sufficient to cover 100 square feet.





Genasco Roll Roofing

On some buildings a roof as ornamental as Genasco Shingles is not deemed necessary—and there Genasco Roll Roofing meets every demand for a plain high-quality roof at a moderate price. Made with smooth surface and also slate surface. A supply of Kant-Leak Kleets—an excellent roof-fastening device—with each roll.

Genasco Slate-Surface Roll Roofing is more attractive in appearance and is highly fire-resistant. Three unfading colors—red, green, and blue-black.

Genasco Protective Products

Reg. U. S. Pat. Off.

Ironing Board Built Into Door

A COMBINED door and ironing board has been designed to meet the modern demand for convenience and compactness. This ironing board is fitted into a 1¾-inch door, requiring no extra space whatever and no work for installation other than that which would be required for the installation of an ordinary door in the doorway.

This ease of installation is an important feature of this appliance. The cost of preparing an opening, such as is needed for the built-in wall ironing board, is eliminated. This effects a considerable economy for the cost of the door is no greater than the cost of an ordinary door plus the cost of the wall cabinet board. Where the board is installed in an old building the saving is even greater for the expense of cutting out the opening is avoided and in addition there is none of the dirt and mess of plaster.



This Ironing Board, Built Into a Door of Standard Size, Is Absolutely Out of the Way and Out of Sight When not in Use and Among Other Uses Makes an Ironing Board Available in Any Bed Room.

This door can be hung either right or left and with the ironing board on either side. It is of a one-panel, raised mould design which will harmonize well with any woodwork and can be finished to match the other woodwork. When the ironing board is closed there is little to indicate its presence. It is easily opened by a quarter turn of the panel fastener and opens by gravity into a "V" shape, the top section forming a table. The ironing board remains in the vertical position till lifted upwards, when it swings into position ready for use. A small slot on the bottom of the board engages the knob on the panel preventing side play.

When desired the panel may be opened and used as a small table. When installed in a kitchen this will often be found a convenience in preparing and serving a meal. In a bedroom it may be used as a sewing table. An ironing board is a handy thing for the bedroom, but few would wish to use wall space for a cabinet board or have it disfigure the room. This board can be installed on the back of the closet door entirely out of sight and out of the way. It is designed throughout to meet the three essential requirements of rigidity of construction, ease of operation and attractiveness of appearance. The board is furnished equipped with a high grade pad.

✣

Building Paper Seals Walls

SOMETHING entirely new in building papers has recently made its appearance on the market and offers unusual insulating possibilities at a low cost. This paper is of the sort which is commonly used for the outer wrapper of prepared cereals and other foods. In building it serves the same purpose as does this outer wrapping of foods, it forms a moisture-proof, air-tight covering.

For sheathing the heaviest grade of paper is used. It is placed with the edges of the sheets over-lapping and the heat of the sun on the walls of the house seals these edges together making a continuous sheet which is proof against wind, rain, sun, rot and vermin. It is easily handled and will not tear with ordinary handling nor after being placed in the walls.

The light and medium grades are used for protecting oak flooring and are particularly effective also between rough and finished floors for excluding dust. The edges are lapped in the same manner and if a hot iron is run along the lapped edges they are sealed effectively against dust. This not only prevents dust from working under the paper but keeps it from collecting between the edges of paper and eventually tearing it. The cost of this paper is about the same as that of red rosin paper.

✣

Truck Mounted Derrick

A TIME and labor saving derrick, which can be mounted on any truck chassis, is adapted to hoisting, loading and digging. It is operated entirely by one man, and the operator always stands on the ground directly facing the job. This derrick has a boom swing of 200 degrees with a cab on the truck, and 360 degrees with no cab. It is made in two sizes, the light duty derrick having a weight of 1,000 pounds and lifting capacity of 1,500 pounds, the heavy duty derrick having a weight of 2,500 pounds and a capacity of 3,000 pounds.

Used with hooks or chains this derrick will lift pipes, girders, beams and other heavy, solid objects. With lazy tongs it handles barrels, bales, boxes and cases. With clam shell or orangepeel bucket it loads sand, gravel, stone, coal and other soft loose materials. Removable teeth on the clam shell bucket make it possible to dig and gather heavy, resisting materials. The boom swings in either direction by power, there is no hand slewing. It is elevated by a worm and hand crank, conveniently located for any angle from horizontal to vertical.



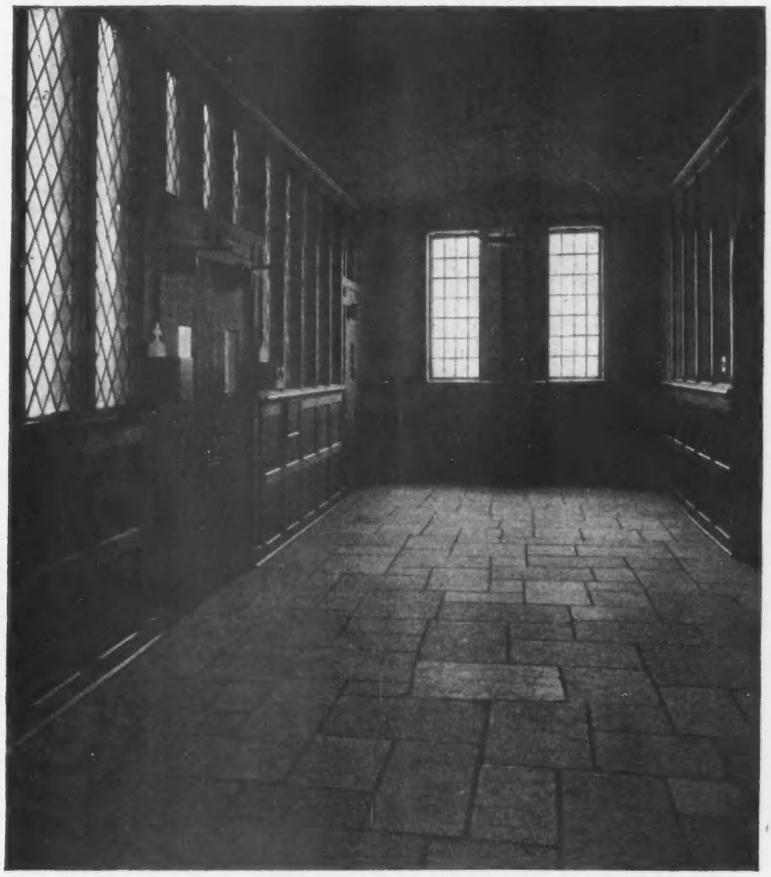
A Derrick Which Can Be Mounted on Any Truck Chassis Is Made in Two Sizes, 1,000 and 1,500 Pounds Capacity, and Is Adapted to Hoisting, Loading and Digging.

The construction of this derrick has resulted from years of experience and the most approved engineering practice. It can be shipped anywhere knocked down, and with the installation instructions, can be installed at any machine shop or garage having the proper facilities.

✣

"Southern Pine Garages" is a plan book prepared by the Southern Pine Association, New Orleans, La., which presents eleven garage designs with instructions for building

(*Department continued to page 492.*)



Trinity Church, Bridgeport, Conn. Klingensmith, Rice & Wilkins, Architects.

Distinctive and Informal METTOWEE STONE

is the last word in "something different" for interior or porch floors. Soft, subtle shades of variegated colors and natural cleft surface instantly wins the approval of architect and owner.

Again nature demonstrates her standards of good taste in building construction.

Let us tell you more about this interesting stone. Our circular "M" will be mailed upon request.

VENDOR SLATE CO.
INCORPORATED
EASTON, PENNSYLVANIA

ESTABLISHED 1886

PENBERTHY INJECTOR CO.

DETROIT, MICH.

CANADIAN FACTORY: WINDSOR, ONTARIO, CAN.

Products

"PENBERTHY" AUTOMATIC CELLAR DRAINER

Also manufacturers of "Penberthy" Automatic Injector; Auto-Positive Injector; "XL-96" Swimming Pool Heater; "XL-96" Ejector; Safeguard Water Gages; Water Heaters; Oil Cups; Grease Cups; Air Cocks; Carburetors; Oil Burners, etc.

PENBERTHY PRODUCTS REG. U.S. PAT. OFF.

TRADE-MARK

"Penberthy" Automatic Cellar Drainer

Advantages—(1) All parts are brass, except the copper float; all working parts are above water; no slime or corrosion.

(2) A foot valve in the strainer seals the suction pipe when the drainer stops working, holding the water in all the pipes, so that it is always primed ready to start instantly. Cellar can not flood with city water if for any reason the pressure is insufficient to operator the ejector.

(3) It takes up half the space of other drainers.

(4) The operating valves open and close instantly by action of the water pressure. (5) No leather washers used; leather dries and causes leaks. (6) It is the most efficient drainer on the market and costs no more.

(7) All parts are instantly accessible, without disconnecting the pipes or removing the drainer. All working parts are conveniently located on top.

CAPACITIES AT DIFFERENT PRESSURES AND ELEVATIONS PIPE SIZES, ETC.

Size and model	Pipe sizes, in.		Working head, ft.	Maximum net capacities from sump in gallons per hour at 10 to 100 lbs. water pressure.								
	Supply	Discharge		10	15	20	25	30	40	60	80	100
				MODEL "R"								
No. 1 Model "R"	½	1	3	80	210	300	340	400	510	700	720	700
			6	....	90	140	240	300	390	570	670	690
			9	....	....	90	150	210	330	480	620	660
			12	....	....	....	100	150	220	390	550	630
			15	....	....	....	....	90	190	300	450	600
			18	....	....	....	....	....	120	250	320	550
No. 2 Model "R"	¾	1¼	3	190	390	550	620	750	910	1180	1240	1220
			6	....	210	340	420	600	750	1020	1140	1200
			9	....	...	210	300	380	540	900	1090	1150
			12	....	...	....	210	300	420	780	1020	1110
			15	....	...	....	....	210	370	570	940	1050
			18	....	...	....	....	....	300	510	850	970

Discharge pipe should never be smaller than specifications shown in table.

Unless otherwise specified, the Model "R" drainer is supplied and used for all conditions above the heavy line running through the table of capacities (see table above).

For conditions below heavy line we furnish a low pressure drainer.

The Model "R" drainer requires 5 lbs. water pressure or more for each one foot of elevation, while the low pressure drainer will work on 2 to 4 lbs. per foot of elevation. When it is desired to use steam pressure to operate drainer, we supply special steam jet at no additional cost.

Where higher capacities are required than those shown above we urnish Model "L" drainer.

MODEL "L"

Size and model	Pipe sizes, in.		Working head, ft.	Actual capacities in gallons of water per hour taken from sump and not total amount of discharged water				Dimensions over all. in.	
	Supply	Discharge and suction		At 25 lbs. will elevate	At 40 lbs. will elevate	At 60 lbs. will elevate	At 80 lbs. will elevate	Height	Diam.
No. 3 Model "L"	1	1½	3	660	1100	1440	1650	20¾	9½
			6	520	860	1230	1440		
			9		720	1050	1320		
			12			840	1040		
			18				760		
No. 4 Model "L"	1¼	2	3	960	1600	2020	2400	22½	11¼
			6	760	1240	1880	1980		
			9		1040	1600	1800		
			12			1280	1440		
			18				1050		
No. 5 Model "L"	1½	2½	3	1280	2100	2700	3200	25⅜	15⅛
			6	1000	1620	2300	2820		
			9		1260	1960	2600		
			12			1560	2060		
			18				1500		

Note: Capacities are the *actual capacities of water taken from sump*, and not combined discharge of operating and drainage water as in most tables. For higher elevations than above, special drainers can be made.

MODEL "R" (ILLUSTRATION NO. 382)

Size No.	1	2	3	4	5
List price	$25.00	$40.00			

REGULAR MODEL (NOT SHOWN)

Size No.	1	2	*3	*4	*5
List price			$55.00	$80.00	$110.00

*Made in Size Nos. 3, 4, 5 only. Write for circular No. 93.

NON-AUTOMATIC

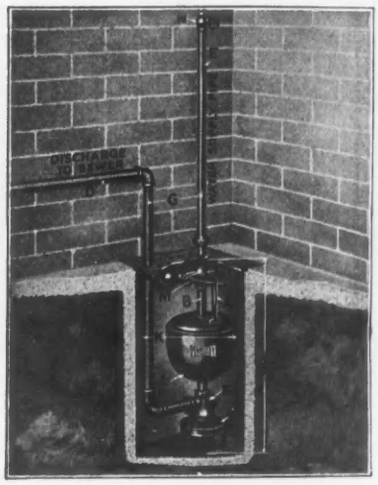
Size No.	1	2	3	4	5
List price	$15.00	$25.00	$35.00	$50.00	$70.00

Capacities, pipe connections, etc., same as other models listed above



"PENBERTHY" AUTOMATIC CELLAR DRAINER

E—Water pressure pipe.
C—Water valve
D—Discharge pipe
F—Ejector
B—Suction pipe
H—Strainer



No. 382. CONSTRUCTION OF "PENBERTHY" AUTOMATIC CELLAR DRAINER

Guarantee—All drainers absolutely guaranteed perfect in working and workmanship.

Specifications

Furnish and install in a suitable sized pit (see mason specification) in cellar of building a "Penberthy" automatic cellar drainer (made by the PENBERTHY INJECTOR CO., Detroit, Mich.), in accordance with directions furnished by the manufacturers, this outfit to be placed below the basement floor and conform to the following specifications:

Size No.	Power line iron pipe size	Discharge iron pipe size	Diam. of pit	Depth of pit

Additional Information—The pit should be placed so that all surplus water will drain to it, and may be constructed of cement, brick, sewer crock or other suitable material.

A cover should be provided that is not airtight and should be made in two pieces, these halves being cut out to fit around the pipes, D and E (No. 382).

Size No.	E City pressure (or steam) line iron pipe, size, in.	D Discharge line iron pipe size, in.	K Extreme diam. of drainer, in.	J Height of drainer (valve open) in.	G Approximate centers of pipe cut-outs in cover, in.	Minimum size sump	
						Diam., in.	Depth, in.
1	½	1	10⅜	21½	6	12	24
2	¾	1¼	12⅞	21½	7½	16	24
3	1	1½	15⅛	25⅜	13	20	28
4	1¼	2	18½	27½	15⅞	24	30
5	1½	2½	20⅝	27⅝	17½	26	30

Letters at top of columns refer to No. 382.

It is a good fault to have the pit a little larger than actually necessary, especially deeper to allow dirt to settle below strainer.



This charming small house (A. B. LeBoutillier, Architect) shows the beautiful effect of a blended red roof in Cabot's Stained Shingles, Wall Shingles in Old Virginia White and Trimmings in Double White.

Color-Mixing Revolutionized

Permanent Pigments as Rich and Transparent as Vegetable Dyes and More Lasting than Paints.

Cabot's Creosote Shingle Stains

The Latest Development in Colloidal Chemistry.

Cabot's Stains—the pioneer shingle-stains and the standard for over forty years—are now made by our true colloidal process, which reduces pure pigments to such sub-microscopic fineness that they will pass through filter-paper and will penetrate so deeply into wood—like dyes into cloth—that the color lasts until the surface of the wood is worn off. Made with pure colors only (no barytes, chalk or other filler) and with Cabot's Creosote, which thoroughly preserves the wood.

Cabot's Stained Shingles

The Highest Grade Red Cedar Shingles Stained with Cabot's Stains.

The genuine Cabot's Stained Shingles—sound lumber, straight grain, non-warping, durable—are thoroughly stained and preserved with Cabot's Stains.

Cabot's Stains sold by leading paint dealers all over the country.

Cabot's Shingles sold by lumber dealers.

Send for samples on wood of Silver and Weathered Grays, Moss-Greens, Browns, etc.

Samuel Cabot

Incorporated

Manufacturing Chemists

141 Milk St., Boston, Mass.

342 Madison Ave., New York
5000 Bloomingdale Ave., Chicago
Philadelphia, Kansas City, Minneapolis, Los Angeles, San Francisco, Portland, Ore.

Other Colloidal Compounds

Cabot's
Waterproof Collopakes
For tinting and waterproofing Stucco, Brick, Concrete, Stone and Wood. Soft, pastel-like tones. More fluid than paints, easier to apply, lower in cost.

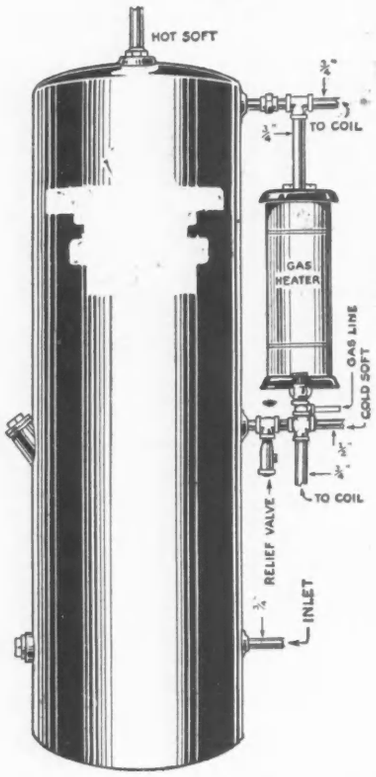
Cabot's
Old Virginia White
The brilliant white stain. As bright as new whitewash and as lasting as paint.

Cabot's Double-White
Whiter than white lead paint, and two coats will hide a surface equal to three of common paint.

Cabot's Heat-Insulating and Sound-Deadening "Quilt" Conservo Wood Preservative, Double Colors, Waterproofings, Mortar Colors, etc.

Improved Water Softener

ABOUT two years ago a certain manufacturing company started out to eliminate all of the unpleasant features which might be connected with any method in softening water. The company feels that it has to a marked degree accomplished this purpose and is now offering to the public a water softener which is the result of its efforts. The credit for the success of the effort is largely given to the discovery of the eliminating salt which is used in this softener.



This New Water Softener Is a Non-Regenerating Type and Ordinarily the Eliminating Material Should Last About Four Years.

This eliminating mineral is continuous and non-regenerating in its action. It will not last forever but has produced over 100,000 gallons of softened water before it had to be renewed. The softeners in which this performance was obtained were used on water of 20 grains hardness. Since it is estimated that the average home uses not more than 25,000 gallons of water a year, the salt should last about four years without renewal.

Should this softener be overtaxed, it is so constructed that the water will return, automatically, to the softener and by constant rotation will come into contact with the mineral and be put into condition. When used in combination with a boiler and heater it is provided with an automatic relief valve which eliminates all danger from excess pressure which might, and sometimes does, exist with a range boiler. The softener is made in a variety of sizes to meet every requirement.

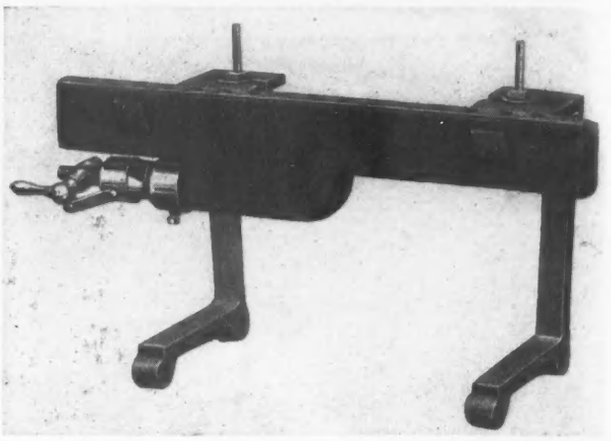
✣

Highly Efficient Gas Burner

THE distinguishing feature of a most successful gas burner is its automatic air mixer and pre-heater which results in the burning of a large proportion of air in the gas mixture. This air mixer automatically and scientifically adds to the gas the maximum volume of air required for complete combustion as the supply of gas is turned on or off. It never requires regulating and will never get out of order with ordinary usage.

The preheater is entirely safe with no danger of back firing into the mixer. It is arranged so that the gas travels back and forth through small channels in the hot burner before it is ignited at the top. This allows the gas to become heated before combustion and makes for a complete reaction between the oxygen and carbon in the mixture, producing a high volume of heat.

Another feature is a water vapor pan, incorporated into the heater, which vaporizes the required moisture for carrying the heat, from the burner, rapidly to all parts of the room or house. The complete combustion attained with this burner makes it odorless and does not produce any carbon monoxide which causes sleepiness, headaches and even worse effects. The burner is incorporated into the form of open fireplaces of imitation oak log type in three styles and sizes.



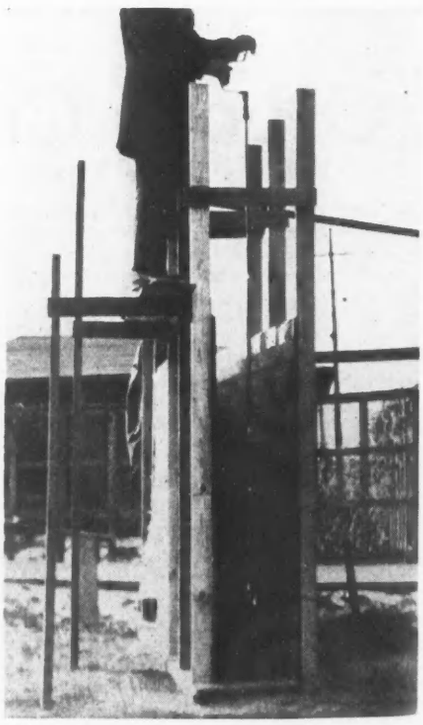
An Automatic Air Mixer and Pre-Heater Are the Basis of the Remarkably High Efficiency Claimed for This Gas Burner.

✣

Time Saving Wire Twister

A NEW tool, which should prove valuable to the contractor who handles concrete work, has appeared for twisting wire. This wire twister has been carefully tested and improved to meet important requirements. It will twist the wire five times as fast as can be done by hand.

There is a saving in time by building forms to their full height before placing on the footings and with the use of the twister, this is possible without the necessity of squeezing down into the forms to twist the tie wires. The manufacturers claim that the contractor using this tool will save more than its cost on 700 square feet of double form area. It is highly serviceable for all kinds of foundations, columns, concrete areas on reinforced buildings, balustrades or bridges and ramps, for twisting guy wires and many other uses.



The Contractor Doing Concrete Work Will Find This Wire Twister a Great Convenience in Building Forms.

The tool, which is made of hardened steel, should last a lifetime if not abused. It comes complete with three 28-inch extension bars, which will fit into the carpenter's tool box, and when put together, including the tool and carpenter's brace, will extend down into a form 94 inches.

(*Department Continued to 498.*)

Indifference in the selection of building materials can mean but one thing—***bitter disappointment in the years to follow.***

How often have you seen cracked walls, sprung woodwork, leaking roofs—***every one of them preventable***—and very costly in the end?

When you build or remodel, follow the example of the man who builds his ***second*** home. Know your materials before you buy!

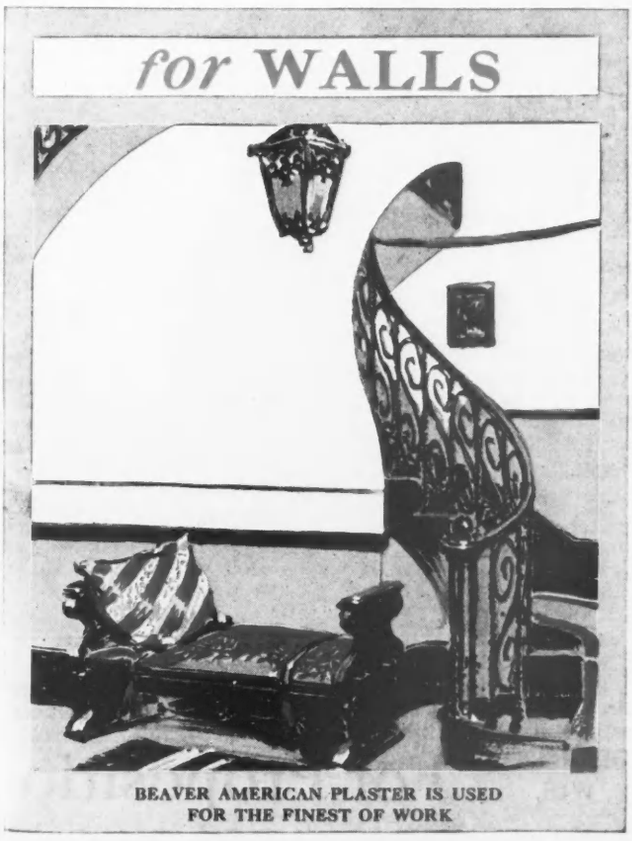
Investigate Beaver Products for walls, for roofs. Prove to yourself that they will build more durable and beautiful walls and better sealed, more lastingly attractive roofs. ***You*** be the sole judge of their true economy. They invite your decision. Test and compare.

Dealers and builders who supply and recommend Beaver Products to their customers are helping them to ***avoid building mistakes.*** They are building a lasting and profitable business on a firm foundation—***satisfied customers.*** Whether you are building or are supplying building materials to builders, you are sure to enjoy the greatest satisfaction from Beaver Products. If you are not acquainted with them, send us the coupon for samples and information. Address Dept. 1804.

The Beaver Products Co., Inc.

Buffalo, N. Y.

"Consult the BEAVER PRODUCTS DEALER in Your Town"



BEAVER AMERICAN PLASTER IS USED FOR THE FINEST OF WORK

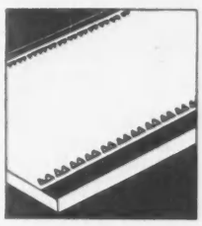


Beaver American Plaster

recommended by most reputable builders because of its exceptionally uniform and easy working qualities and because of the strong durable wall that it builds.

Beaver Fibre Wall Board

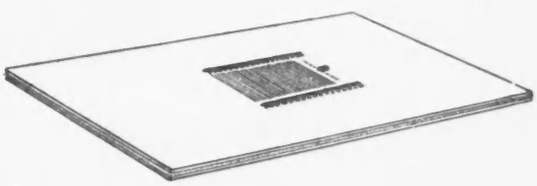
The *superior* wall board — first on the market and still first in quality and service. Sealtite moisture-proofed art mat surface. No priming needed.



Beaver Vulcanite Hexagon Slabs



Beautiful pattern effect. Width of slab three times exposed surface. Perfect weather-tight seal combined with extra thickness.



Beaver Bestwall

the superior plaster wall board. Unequaled for decorative possibilities, strength and durability. Get a sample. Test and compare. Look for the cream colored surface when you buy.

Mail Coupon for Information and Samples

BEAVER PRODUCTS CO., Inc.
Dept. 1804, Buffalo, N. Y.

Please send me complete information about Beaver Products, and samples if possible.

Name.....

Address.....

City..... State.....

Check: ( ) Home Owner ( ) Dealer ( ) Contractor

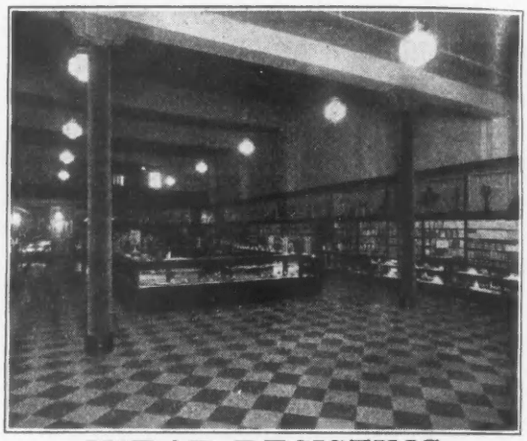
The ULTIMATE Floor

The last word in Floor-Permanence
Combined with Practical Beauty and Economy



ECONOMICAL

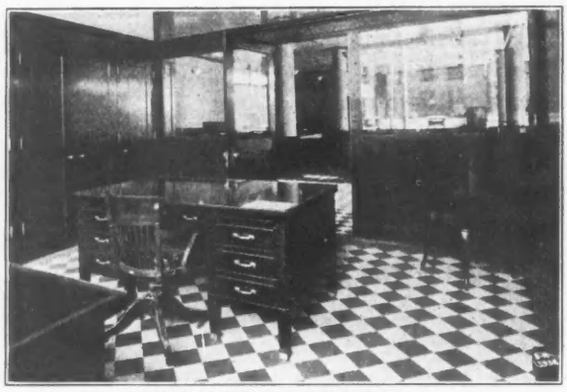
In a kitchen, Wright Tile delights women with its serviceable, charming appearance—and it is NOT too costly for any home!



WEAR-RESISTING

Department stores choose Wright Tile for safe footing, easy cleaning, lasting looks and highest durability under traffic.

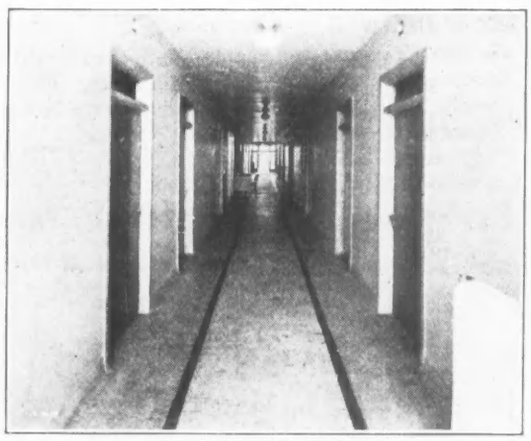
Illustrations show a mere few of a host of installations to whose builders we will gladly refer anyone interested in everyday practical figures.



LONG-LIVED

In offices as in stores, Wright Tile has seven qualities which commend it above all floorings for utmost value for any money.

Inexpensive enough for a modest home, yet used in the finest of today's magnificent buildings of all sorts, this flooring fits into any plan.



NOISELESS

Hospitals prefer Wright Tile because it is utterly silent under foot, longest-lasting, and by far the most hygienic of floors.



BEAUTIFUL

Churches install Wright Tile and create a surface of sumptuous and appropriate appearance, practically imperishable.

Write to Wright

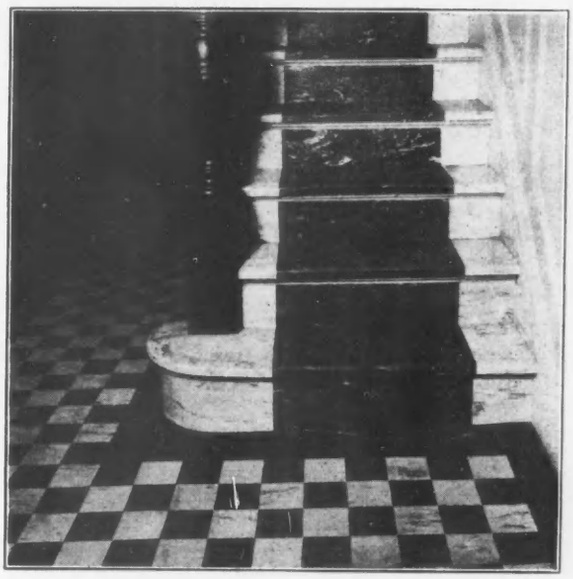
RUBBER PRODUCTS CO.
RACINE, WIS.

For Proposition

Makes Money for the Builder

While the rubber-tile floor's unequaled merits are as yet not widely familiar, be FIRST among your locality's builders to CASH IN ON THE GREAT VALUE of this specialty which makes reputation for the men who install it—and profits besides.

WRIGHT
RUBBER TILE



OBSERVE *how Wright Tile can easily be used to beautify an OLD stairway WITHOUT RIPPING OUT THE TREADS OR RISERS. The picture here illustrates it use on*

STAIRCASES

The builder made a REAL PROFIT on this job. It is only one of scores waiting for some LIVE ONE to bid on such renewal.

Any decent carpenter can learn in an hour to lay this perfect flooring perfectly

Your own men can easily master the whole art of laying Wright Tile perfectly. You need no factory expert at big expense. Our Service Department will plan any job for you in detail. The rest you can do without taxing your profits.

LOOKING INTO OUR PROPOSITION RISKS YOU NOTHING!

You can **GUARANTEE** any proper installation you make of Wright Tile, and we will back the guarantee. Simply follow our simple rules. And every job will bring you another—that is the way Wright Tile is selling nowadays through builders.

If there actually IS real money for you in this, you want to know it and know it **NOW**. That is all we ask you to consider. Write us, indicating kind of job you MIGHT figure on, and let us show you what there is in it for you with this specialty.

WRIGHT RUBBER TILE FITS INTO ANY SPECIFICATIONS

Regularly Supplied in 4″x4″—6″x6″—9″x9″—12″x12″ or 18″x18″ TILE UNITS

Borders To Match or Contrast In Suitably Proportioned Widths

STAIRWAY TREADS—42″ lengths COVING—42″ lengths

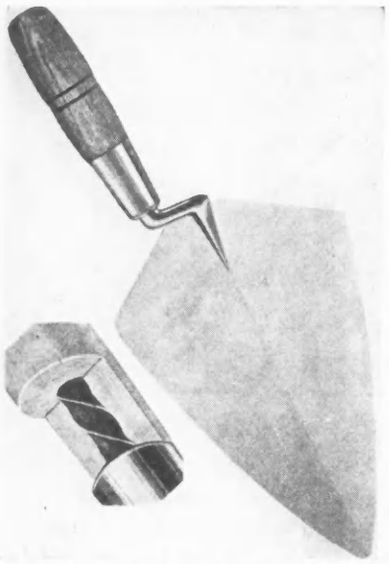
Immense Choice of Colors, Plain or Modeled, to Create Any Color-Combination for Any Interior

EXACT DATA ON CURRENT INSTALLATIONS ALWAYS AVAILABLE

WRIGHT RUBBER PRODUCTS CO., Dept. A. B.-4, RACINE, WIS.

New Spiral Tang Trowel

A PATENTED spiral tang that locks together the blade and handle is a feature of a new type of bricklayer's and tilesetter's trowel being made by a leading manufacturer of saws, tools and files. The blade and tang are made in one solid piece of steel, hardened and tempered for this particular work. The tang is formed into a spiral and the hardwood handle is then forced onto this tang with a revolving motion under great pressure. The tang locks with the handle along its entire length so that it can not work loose. This new feature is said by the manufacturers to overcome the difficulties with loose handles experienced with the old style handle and tang.

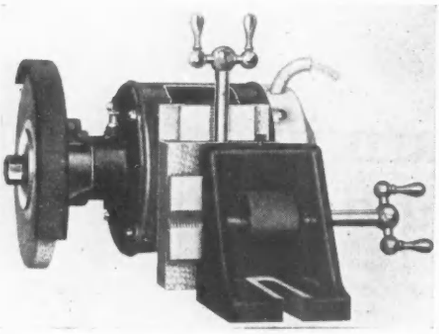


A New Type of Spiral Tang Locks the Handle Securely to the Blade of This Trowel.

✣

New Double Slide Grinder

A NEW, double slide, angle plate grinder, equipped with ball and sleeve bearings, has been announced by a well known machine manufacturer. This grinder has a vertical travel of 5½ inches and a horizontal travel of 4¾ inches. Both slides operate independently which permits of quick and accurate adjustment to the work in hand.



This New and Improved Grinder Has Recently Been Announced by a Well Known Manufacturer.

Standard machines, furnished from stock, are made for operation with 60 cycle alternating current, one phase, for connection to lamp sockets and three phase for connection to power circuit lines. The single phase is made for 110 volt and 220 volt operation and the three phase for 220 volt operation. For use with direct current these machine are made in 115 and 230 volt types. All types are rated at ½ horsepower.

Machines can also be furnished for special voltages in both the alternating and direct current types. Each machine is supplied with a wheel guard, electric cable and attaching plug, operating switch and grinding wheel.

✣

To Prevent Corrosion

ONE of the greatest wastes in industry is that caused by corrosion of metals and the annual loss to this country is estimated at more than a billion and a half dollars. Protective coatings of many kinds have been used in the attempt to prevent corrosions and have met with varying degrees of success. In order to be effective the coating must penetrate the exposed surface, adhering firmly and filling up every pin hole and crevice so that the surface is completely sealed against the destructive action of water, acids and alkalis.

Solutions especially designed for this purpose combine the three essentials of a permanent protective coating, they are waterproof, alkali-proof and resist the action of acids. They can be used effectively on concrete as well as metal and are applied direct to the concrete without sizing. These solutions are compounded from coal tar derivatives, carefully heat treated so that they will not crack, chip or peel. They contain no vegetable or animal oils, grease or turpentine.

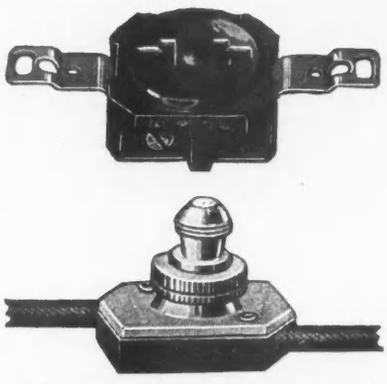
When properly applied they will always reduce, and in most cases eliminate, corrosion. They also prevent the pitting action of electrolysis. They can be applied on metal, concrete, brick, stone or wood surfaces in structural work on both exposed and concealed surfaces where protection is required. They should never be applied over painted surfaces and should not be mixed with paints, thinners or dryers. When a painted or corroded surface is to be treated, the solution will penetrate the paint and rust, loosening it so that it can be removed and the solution can then be applied to the clean surface, which should be free from grease, dust or oil. The solutions will withstand a temperature up to 600 degrees, and can be washed with lye, potash, caustic soda or other cleaning compounds.

On metal the base coat must be black. Over this other colors may be applied as desired. On concrete, brick, plaster, cork or terra cotta the color solutions are applied direct without the black coat. Colors include maroon, olive-green, red, gray, buff, white and others. These solutions when covered with a special enamel are odorless and will not contaminate or impart a taste to the contents of a tank. They are used for fresh water tanks, ash hoppers, bilges, bunkers and all similar purposes.

✣

Plain Black Porcelain Outlets

A NEW line of black porcelain convenience outlets with plain faces has just been announced. The face of this new outlet is smooth, unmarked, and highly glazed, and is slightly recessed to guide the attachment plug cap blades into the tee-slots. These new plain face outlets are made in the shallow side wired type, both single and duplex, and they replace the outlets of the same type with marked faces.

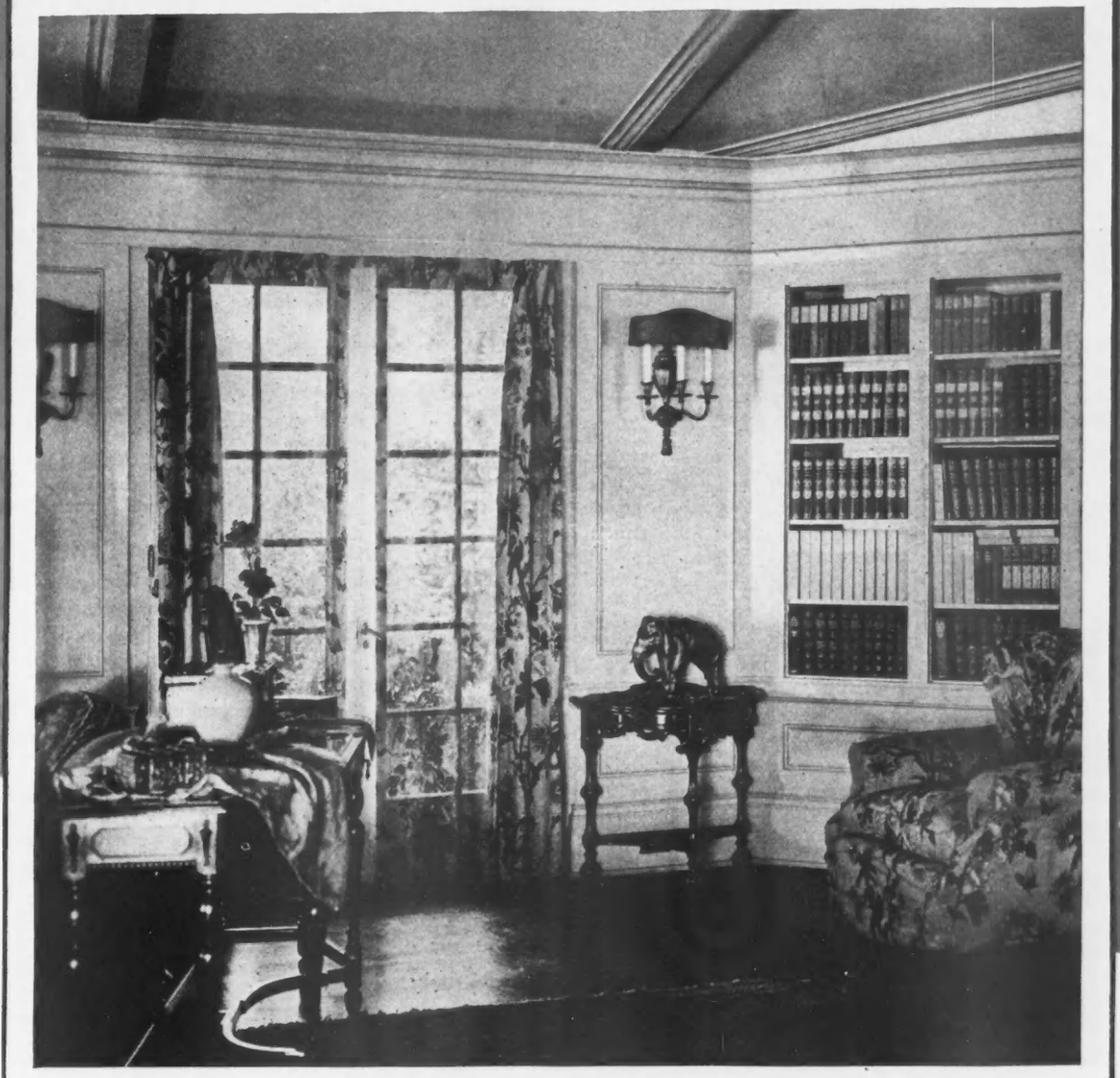


The Convenience Outlet, Above, Is of Black Porcelain and the Switch, Below, Is a New Canopy Type.

This company has also brought out the new canopy switch illustrated. It is designed for fixture work and is particularly suitable for side wall canopies and brackets. The switch, as can be seen, is small, compact and neat in appearance. The handle may be turned in either direction without danger of unscrewing. Vibration cannot loosen it.

This swtich can be quickly and easily installed, and the handle does not have to be removed when installing. These switches are made with stem lengths of 3/16, 5/16 and 7/16 inches.

(Department continued to page 504.)



IN the old days, people lighted their way to bed with a lamp; drew water from a well; rode to town behind a horse.

Nowadays, they snap on an electric light; turn a faucet; put their foot on the gas!

You will find the same progress has been made in building materials.

Nowadays, people are using the modern material—Upson Board—in place of lath and plaster. Architects and builders the country over are recommending it for the finest work. Why don't *you* try Upson Board for just one fine interior? You'll like it.

WRITE FOR BLUE PRINT

Ask your Upson dealer about the new Upson Blue-Print Service. If he hasn't yet installed it, write us, describing the work you plan.

We will send you samples and a full-size blue print, free.

FOR BLUE PRINT, ADDRESS THE UPSON COMPANY, 305 UPSON PT., LOCKPORT, N. Y.

BOARD

for WALLS ·· CEILINGS ·· SHEATHING ·· INSULATION

Ice-Cooled Drinking Fountains

SANITARY, ice cooled drinking fountains, made to supply every demand for cool, refreshing drinking water in shops, factories, offices, stores, schools and other buildings, can be attached directly to the municipal water supply. They are so constructed that the drinking water does not come in contact with the ice. The water connection is at the bottom of the tank and the water is drawn through copper tubing, tinned both inside and outside. The ice is placed in a center chamber directly in contact with the cooling coils.



Here Is an Ice Cooled Drinking Fountain in Which the Water Does Not Come in Contact with the Ice.

The base and bottom of the tank are of heavy cast iron, the outer shell of the tank is 19 gage, blue annealed steel, painted inside and outside with rust-proof paint. The inner shell, or ice compartment, is made of 16 gage iron, either hot galvanized or tinned, after being fabricated. It is perforated with ½ inch perforations to enable the ice water in the ice compartment to come in direct contact with the cooling tubes.

The coils are 20 gage soft copper tubing and will withstand a pressure of 200 pounds. A sufficient number of coils are used to insure rapid cooling. The best grade of granulated cork is used between the bottom of the stand and the bottom of the ice compartment and between the outer shell and the inner shell and is thoroughly tamped. The cover or lid is made of cast iron and lined with one inch of granulated cork.

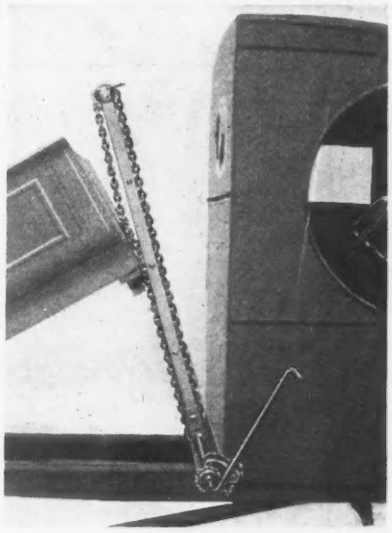
Unless otherwise specified all fountains are equipped with a patented bubbling head with a regulator which controls the height of the stream and the volume of water. Each is supplied with a self-closing stop cock. All small fittings are nickel plated. The waste bowl is cast iron, pure white, vitrified, porcelain enameled on the inside. These fountains are finished in an attractive, gray, rust-proof color but for a small extra cost can be obtained in any standard color to harmonize with other fixtures.

✣

Practical Ford Truck Hoist

A GREATER range of use for the Ford steel truck body has been made possible by the development of a simple, reliable hoist which can be adapted to any body built for the Ford truck. It is simple in design and constructed of the best annealed steel so that it is durable and will not get out of order. The chain used is tested for 6,800 pounds, capable of lifting any load customary for such trucks and it operates over a ball-bearing roller which enables easy operation.

A double acting, spring lock ratchet and dogs permit the body to be automatically locked at any angle and dumping the load requires only a few seconds. The body is mounted low, resting on the frame, just as the truck comes from the factory, which eliminates topheaviness and quick depreciation as well as uneven wear on tires. The installation of this hoist is quickly and easily accomplished without any alterations in the truck. No holes need be drilled and every part is made to fit any regular body and frame utilizing every inch of available space and fitting snugly up against the cab. This hoist comes complete with crank and hinges ready to install.



This Simple, Reliable, Hand Hoist Increases the Range of Use of the Ford Steel Truck Body.

✣

New Model Heavy Duty Trucks

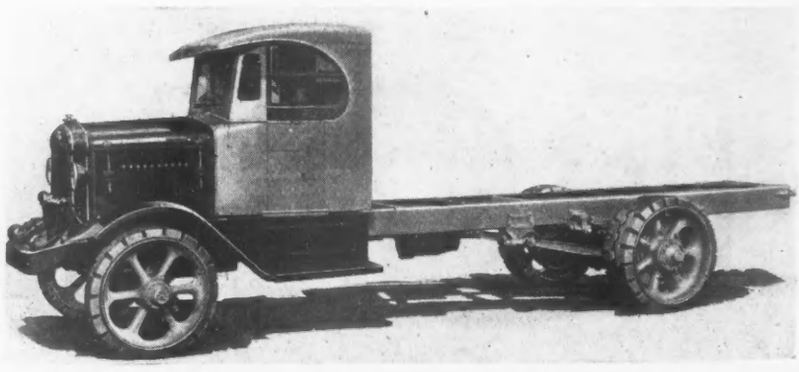
NEW heavy duty trucks especially designed to adequately care for the increasing hauling problems of industry are announced by one of the big truck manufacturers. The needs of every industrial division requiring sturdy and powerful trucks were thoroughly studied by competent engineers and their findings were used as the basis of the mechanical and engineering design of the new trucks.

Two of the models, the 5-ton and 3½-ton are known for their inherent strength. The third model, the 2½-ton, has been designed along lines that produce fleetness combined with strength. All three models contain new mechanical and engineering achievements.

Added power has been supplied in these new trucks and new manufacturing methods have permitted even finer limits of accuracy. Several new features of design have been added to further increase the ease of performing necessary service operations.

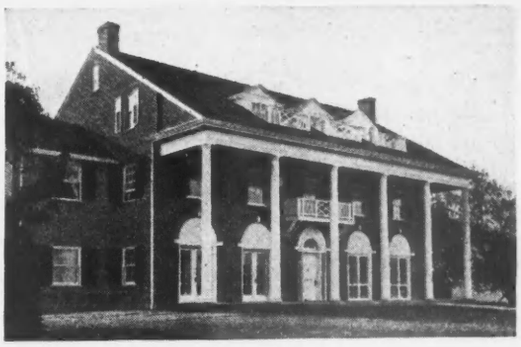
Investigators discovered that driver comfort and ease of operation were points long overlooked in truck design, and that this comfort would greatly add to the efficiency of the truck's operation. To meet this demand, an all-steel cab was designed and is used as standard equipment. This cab is rattleproof, has a one-piece full vision ventilating windshield, comfortable spring seats, and is equipped with sliding doors and sliding curtains providing complete protection against the worst weather. The new models are fully equipped.

(*Department continued to page 508.*)



A New Model Heavy Duty Truck Which Features a Cab Providing Comfort and Ease for the Truck Driver.

UNION METAL COLUMNS



Union Metal Columns, Roman Doric Type, Design 246, on Sigma Phi Epsilon Fraternity House, Oregon Agricultural College, Corvallis, Oregon. Architects: Freeman and Struble, Salem, Oregon. Contractors: McFadden and Swain, Corvallis, Oregon.

Beautiful and Permanent

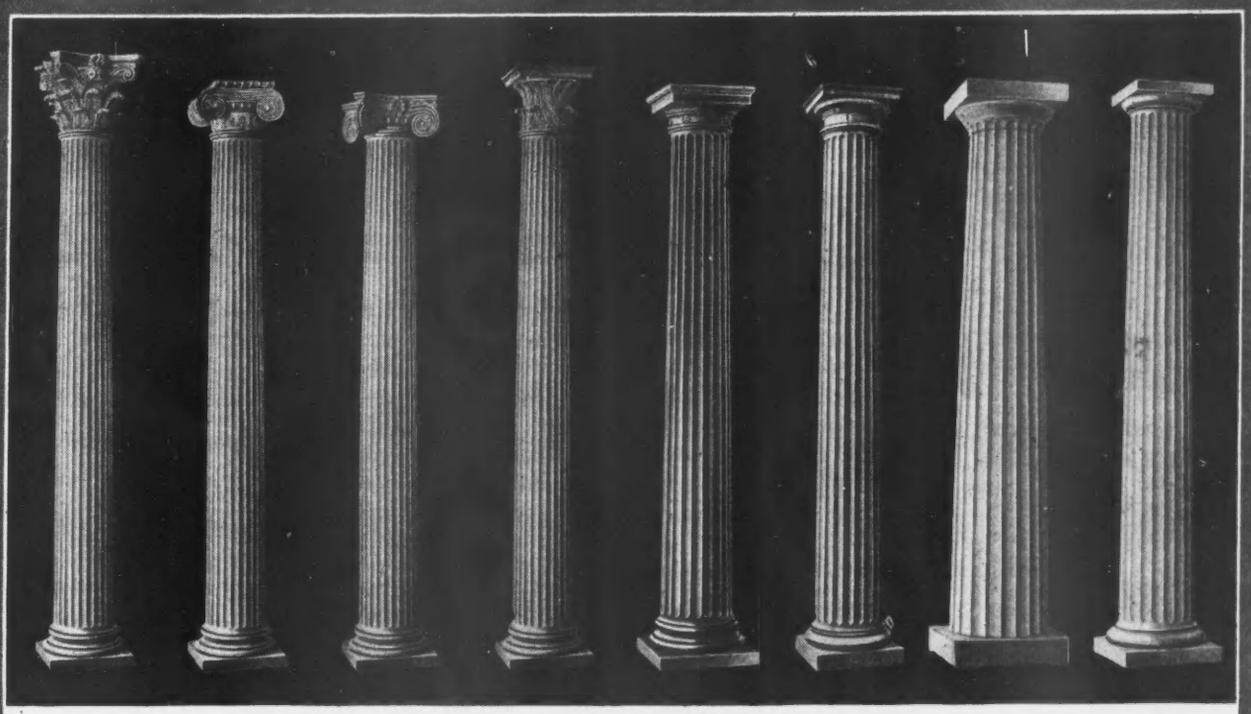
At moderate cost, the architects and contractors have given to this building the beauty that comes from the tasteful use of Union Metal Columns.

And that beauty is permanent, for all the styles of Columns shown below are made of enduring copper bearing steel, further protected by galvanizing inside and outside.

All Diameters 8″ to 42″ and Heights 5′ to 42′.

Send for Handsome Catalog No. 50

THE UNION METAL MANUFACTURING CO.
General Offices and Factory, Canton, Ohio
Chicago Office—230 South Clark Street

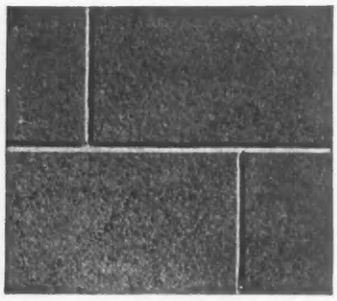


Design 212 Roman Corinthian | *Design 230 Greek Ionic* | *Design 237 Modern Ionic* | *Design 213 Temple of the Winds* | *Design 224 Roman Doric* | *Design 246 Plain Doric* | *Design 700 Greek Doric* | *Design 240 Modern Doric*

THE ONES THAT LAST A LIFETIME

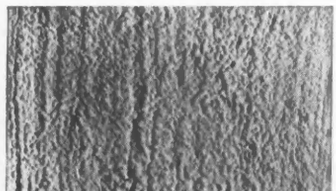
Lime Plaster Wall Finishes

A Wide Choice for the Builder



Sand Finish

This stone-like effect is one of the many attractive sand finish surfaces



French Texture

An antique finish produced by the stippling brush



Spanish Texture

"Pulled" with the cork float, lime plaster yields interesting textures like this

GOOD old lime plaster, the standard plaster material since building began, still offers the widest opportunity to the builder who realizes that good plastering sells houses.

There is no limit to the variety of effects possible through the use of lime plaster.

Smooth Finish

The most common surface is the smooth trowel finish—used when the surfaces are to be papered, painted, or canvassed. Lime plaster will always be standard for this style—because of its sound absorbing qualities and the perfection it makes possible.

Sand Finishes

When the surface is to be tinted or painted, the sand finish is a favorite. It yields a variety of interesting effects—from smooth to rough—attained by the use of wood float, cork float, and carpet float. The builder should not overlook the opportunities in sand finish.

Antique Finishes

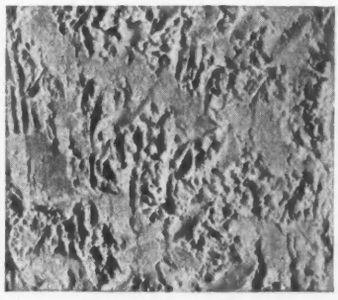
With a mixture of two parts *Tiger Finish* and one part plaster paris, any desired effect can be obtained.

Cover all brown mortar with *Tiger Finish* in the usual way, then with a 4-inch brush, sponge, cloth, stippler or trowel—apply more of the mixture to the white surface—working to the effect desired. A good plasterer will prepare samples from which you can select the appropriate antique finish for the job on hand.



Italian Texture

A highlight antique effect produced with the pointing trowel



Old English

Lime plaster — highlighted with the small trowel—yields a variety of such effects



Spanish American

"Sucked" with the cork float. Such rough textures are best for some interiors



The Kelley Island Lime & Transport Company

World's Largest Producer of Lime

including Tiger Finish, Tiger Mason's, Tiger Agricultural and Lump Limes for All Purposes

Leader-News Building, Cleveland

TIGER FINISH

"SPREADS LIKE WARM BUTTER"

Spain, like Italy, translated its character clearly into its architecture and decoration. The daring freedom with which color was used—the broad architectural spaces achieved by plain plaster walls that formed the background—these are distinctly Spain. A mellow beauty of light and shade was frequently created by texture treatments of the plastered walls.







WHILE exterior beauty attracts the eye and draws the prospective purchaser, nevertheless ninety-nine per cent of all homes are sold on final judgment as to the layout and beauty of the interior.

This year builders are appreciating that this interior beauty is best obtained in natural lime surfaces—antique plastered walls, ceilings, cornices, mouldings, panels, arches or beams—either simple and inexpensive in design for the modest home, or ornate for the palatial residence.

The plasterers of this country are much more interested in jobs which gives to them a means of expressing their art.

The popularity of all-plastered interiors is best expressed in pure white *Tiger Finish*—noted for its uniformity, its high quality, its plasticity—the fact that it "spreads like warm butter".

Bear in mind that lime is the most sound absorbing interior finish—a great selling point.



The Kelley Island Lime & Transport Company

World's Largest Producer of Lime

including Tiger Finish, Tiger Mason's, Tiger Agricultural and Lump Limes for All Purposes

Leader-News Building, Cleveland

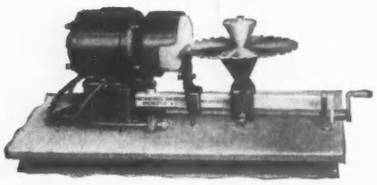
TIGER FINISH

REG. U.S. PATENT OFFICE

"SPREADS LIKE WARM BUTTER"

Saw Jointer and Cutter Grinder

A NEW, combination, circular saw jointer and cutter grinder has recently been placed on the market by a well known saw manufacturing concern. This machine, which can be attached to any light socket, can be used for jointing saws and cutters ranging from 3 to 22 inches in diameter. By merely changing the attachment the machine can also be used for grinding or sharpening inside dado cutters, giving them the proper clearance. It will handle dado cutters measuring from 4 to 20 inches.



A New Combination Circular Saw Jointer and Cutter Grinder Which Should Be Widely Useful.

The attachment portion of the machine is also furnished for use on regular saw gummers and makes possible the sharpening and jointing of both circular saws and inside dado cutters.

The machine is furnished with specifications to adapt it to the electrical current available, information on voltage, cycle and whether direct or alternating current being required.

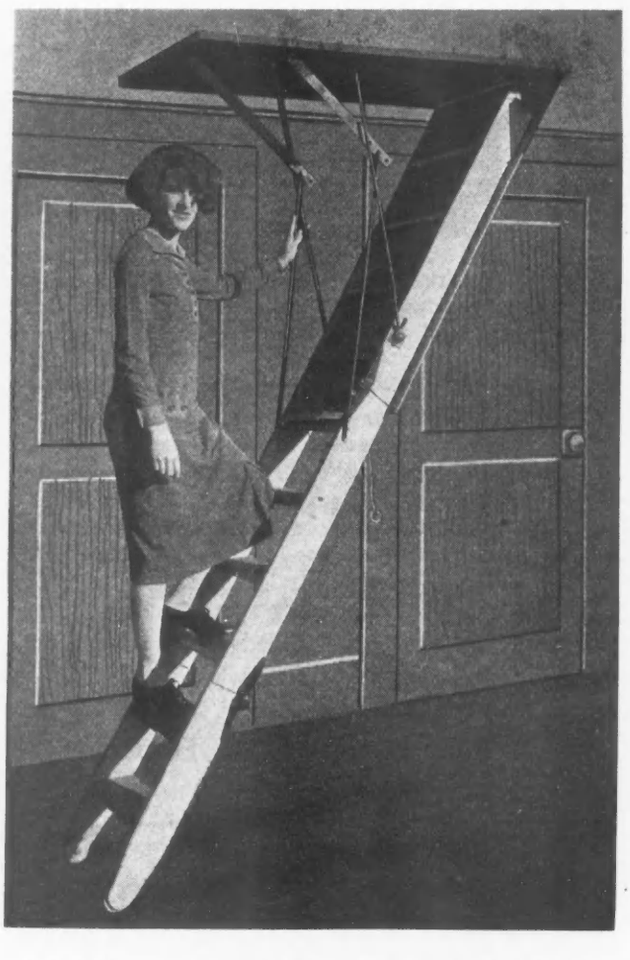
✣

Inexpensive Disappearing Stair

COMPLETE utilization of space is one of the greatest economies which can be effected in the design of modern houses and with the present development of small homes every square foot of floor space counts. The attic stairs are one of the most wasteful features in house planning for these stairs are used only occasionally. Some means must be provided, however, for reaching the attic and the manufacturers of disappearing stairways have solved the problem of providing this means without any waste of floor space.

One of these, when not in use, appears as a neat ceiling panel, 26 by 50 inches, and when lowered to give access to the floor above, may be operated in the smallest of halls or even in a large closet. It is easily opened either from below or from above. A slight pull on the cord opens the stair, unfolding it ready for use. When open it will safely support the weight of three people at once.

This stair is shipped in a single compacted bundle, and is light in weight. The ceiling panels are furnished in natural fir and the inside of the jamb and stair parts is stained a medium dark tone. The casing and panel can also be furnished in oak or birch for a small additional charge. The standard stair is adjustable to ceiling heights of from 7 to 9½ feet. For higher ceilings special prices are quoted. This stair is inexpensive and is easily installed. It is also well adapted for use in barns, garages, summer cottages, schools and old as well as new buildings.

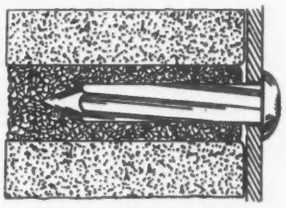


The Disappearing Stair Is One of the Modern Developments Which Makes Possible Great Saving of Space at Little Expense and Without Loss of Convenience.

✣

For Nailing Into Masonry

HOW often have you wished for a nail that could be driven into brick, concrete, mortar and other masonry as you would drive an ordinary nail into wood? It would certainly be useful in a great many places. Such a nail is now available.



This Nail Is Driven Into Masonry Just as the Ordinair Nail Is Driven Into Wood, Which Means Economy and Convenience.

The manufacturers do not claim that their hardened masonry nail will serve to put up a fire escape or anchor a heavy smoke stack, but for some purposes it will be found the easiest, quickest and cheapest means of fastening. These purposes include fastening gutter and lead pipe to brick walls, attaching cornices, flashings, ducts, etc., to brick walls and roof, fastening metal lath, shelving, partition panels, metal ceilings, machine guards, etc., to brick or concrete walls or ceilings, hanging signs and awnings to brick or concrete walls, attaching wire moulding and conduit pipe and fittings to brick or concrete, fastening light railings, stair treads, light machinery, etc., to brick or concrete floors and anchoring meters, brackets, plumbing fixtures, etc., to brick or concrete.

These nails are easier to use because no drilling is required except where material is unusually hard and tough, in which case it is advisable to drill a starting hole about half the length of the nail. They are quicker to use for the same reason, they can be driven just as an ordinary nail is driven into wood. They are cheaper because their first cost is less than other devices for this purpose and because they save much time and labor otherwise spent in drilling holes and do away with drills, shields, screws, etc.

✣

"GOOD planning is most essential in the small house because strict economy in plan and material is necessary to bring the small house within the financial reach of the prospective owner."

(Department continued to page 512)

now it's a Question of getting the Tenants

AFTER months of thoughtful planning and active building construction your apartment building is completed.

Completed, it represents thousands of dollars of invested capital. From now on it's a question of attracting desirable tenants to make that investment yield continuous income.

And the ease with which you attract tenants and establish your investment on an income-earning basis depends upon the modern equipment you provide for their comfort and convenience. For tenants today are buying conveniences. They are buying the convenience of electrical servants—the comfort and convenience of modern plumbing.

The plumbing installation in an apartment suite is a powerful force in persuading prospective tenants. Modern sanitary plumbing is an active force in getting the prospective tenant's name on the lease that insures your income.

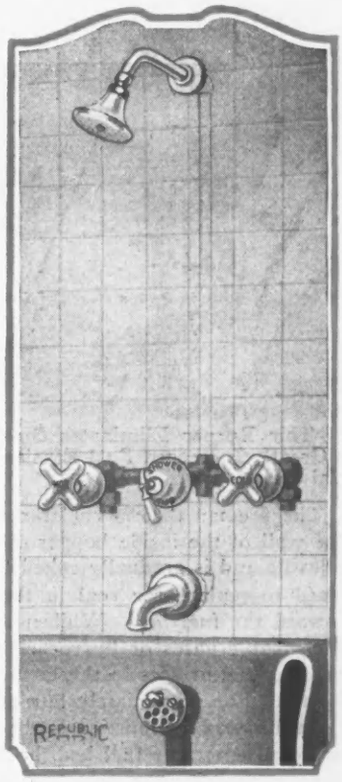
And quality brass goods—Republic Brass Goods—are the "servants of supply" that insure trouble-free performance and permanent satisfaction in the plumbing installation. The plumbing contractor who installs them is a conscientious craftsman—a craftsman who takes honest pride in performing quality work. Consult him on the plumbing installation for your next job.

The REPUBLIC BRASS COMPANY, *Cleveland, Ohio*

Good Plumbing · · Good Business · · Republic Brass Goods

REPUBLIC
BRASS GOODS

No. 1230-C—Two Way Bath Fixture. Patented April, 1926. Patent No. 1579503.
No. 1224-C—Patented March, 1920. Patent No. 1332793.



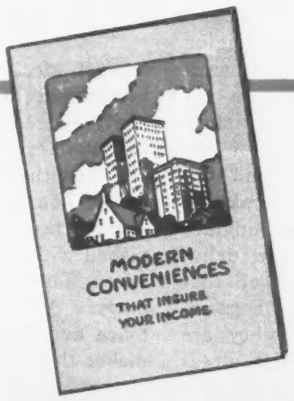
The No. 1230-C Republic Two-Way Bath Fixture

combines bath and shower into one unit with positive control of water temperature.

The desired temperature of the water may be obtained through the spout of the tub and immediately turned into the shower. No icy cold shock. No steaming spray of scalding water—positive assurance of comfort when taking a shower.



A copy of a new book we have just published "Modern Conveniences" explains definitely how modern plumbing fixtures and quality brass goods help to insure a steady income from your building investment



THE REPUBLIC BRASS COMPANY
Cleveland, Ohio

Please send me a copy of your new book "Modern Conveniences."

Name.....

Address.....

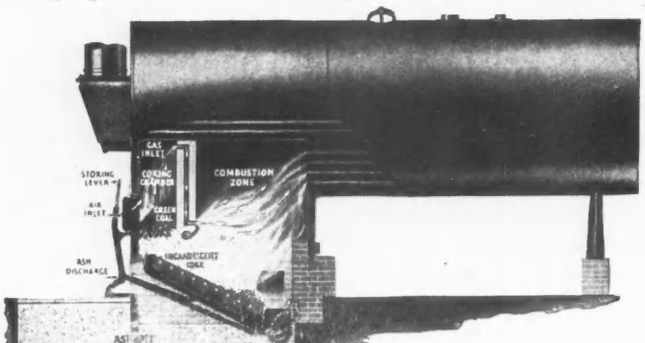
City..... *State*.....

A High Efficiency Furnace

TO meet the demand for a fool-proof device for burning coal, which at the same time will develop high efficiency and smokelessness, a design has been perfected with inside hopper as shown in the accompanying illustration. The design was first applied to low-pressure heating boilers, but is now being used also on high-pressure return-tubular, firebox and even horizontally baffled water-tube boilers.

Heating plants are charged with being the chief cause of the smoke nuisance and with fuel waste. This burner changes this condition by eliminating smoke entirely and increasing the efficiency about 20 per cent, it is said.

It consists of an inside refractory hopper of special design, inclined grate and dumping mechanism. Everything is contained within the furnace except the two levers used respectively for feeding coke to the fuel bed and for dumping ashes.



This Burner Eliminates Smoke, Saves Fuel and Gives a Greatly Increased Fuel Efficiency Without Requiring Special Care.

The fireman throws coal through the firing door against the wall of the inside hopper or refractory arch. The coal piles up and is gradually coked, moving downward and forward to replace the coal in the lower strata as it moves toward the fuel bed. While piled up in the inside hopper the volatile gases or hydrocarbons are distilled off, to pass through the orifices in the hopper wall where they are preheated to be immediately burned in the furnace proper.

In this way combustion is absolutely smokeless; no green coal can enter the fuel bed, because it is thoroughly coked before reaching the fuel bed. It also means high combustion efficiency because of complete combustion and also due to freedom from those fuel bed troubles which are the result of handcleaning of the fuel bed.

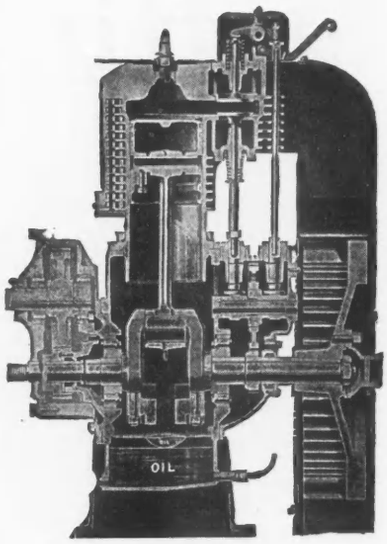
This burner can be installed in any standard firebox boiler, any return tubular boiler and horizontally-baffled water-tube boiler. In many instances the arch is installed by the boiler manufacturer at the boiler plant.

✣

A New Air-Cooled Engine

A NEW air-cooled engine has recently gone into production that is claimed to have more power per pound of operating weight than any gasoline or kerosene engine used in the industrial and agricultural fields. The manufacturers of this engine place particular emphasis on the endorsement of Henry Ford and the U. S. Government regarding the practicability of air-cooled engines, for the reason that the new Ford plane is air-cooled and the government is specifying air-cooled engines for airplanes. They have for 20 years built nothing but air-cooled engines for heavy duty service and the present new engine, delivering 8 H.P., is a development and refinement of all that has been learned in the art of building air-cooled engines.

The simplicity of this engine and its accessibility are clearly illustrated in the sectional view. Particular stress is laid on absence of vibration, the engine's close governing and smooth running, which assures smooth operation. Water and its attendant troubles are dispensed with. It is pointed out that a vibrationless single cylinder engine has inherent advantages over two cylinder engines in dependability and accessibility, it requiring only 15 minutes to inspect the valves and adjust the connecting rod, while on two cylinder engines it takes several hours. Large oversize roller bearings are used for the crankshaft and are practically indestructible.



A New Air-Cooled Engine, One Feature of Which Is Its Lack of Vibration and Close Governing.

Fuel economy, light weight and compactness, which means easy portability and lower cost of installation on labor-saving outfits, are outstanding features, and the figured rating of the engine with 4½-inch bore and 5½-inch stroke at 1,200 R.P.M. is 8.9 horsepower. The actual brake horsepower of any gasoline engine is about 10 per cent less than the figured rating.

This engine is suitable for all kinds of labor-saving outfits within its power range, such as generator units, concrete mixers, hoists, sprayers, etc., and in particular on any machine requiring steady flow of power through all kinds and conditions of weather.

✣

A New Steel Casement Window

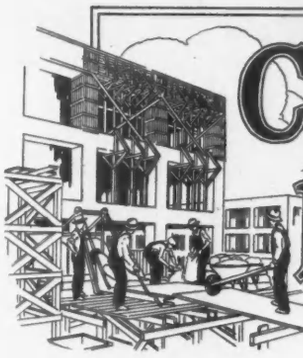
A NEW design of steel casement window has recently been placed on the market by one manufacturer and is meeting with the approval of builders of better homes. These windows are made of specially formed, three-point contact steel, electrically welded throughout. They are heavy and strong giving exceptional durability and are easily operated. They come set up, fully equipped with hardware, ready to install. They are mounted on brass hinges with steel pins and are of the in-swinging type.



Here Is a New Design of Steel Casement Window Which Is Rapidly Winning the Approval of Home Builders.

The construction is such that a screen or wire guard may be easily attached or removed and screens are furnished with either flat or round frames and black or bronze wire. The glass is put in with the best grade, steel sash putty. An automatic lock holds the window snugly in place and the frames engage the sash in a manner which makes the window thoroughly weatherproof.

(*Department continued to page 644.*)



CONTRACTORS' EQUIPMENT

McKINLEY said, shortly before he was shot, "The victories of peace are greater than those of war." The building industry has won some notable victories in the last few years and its prestige is greater today than ever before. It has become America's foremost industry. But the evolution of industry must continue and the building industry, in particular, must go on to new achievements. It must not be content with the methods of yesterday when new and better methods come along.

Lower Costs from Better Methods

In some industries, such, for instance, as the automobile industry, price reductions have been made possible by better methods and more efficient equipment. Cars, today, are both better and cheaper.

The building industry, as we see it, has also reached a point where better methods should make it possible to meet the demand for lower priced housing. The answer, of course, is more brains and less brawn—more mechanical power and less human toil. In other words, more of the efficient mechanical devices and less of the older, slower methods.

Under the new regime, skilled labor will still be needed. The craftsmen and the building trades will still be on the job but promoted to be captains of power where before they were servants of toil.

There is great efficiency now on most of the big building work. One sees giant power shovels, derricks, cranes and hoists digging, transporting and erecting, while motor trucks carry away the excavated earth and deliver to the site a huge tonnage of building materials. Steel frames rise as by magic to the rapid tattoo of the riveting hammer.

Much has been done to facilitate and hasten the work of bricklayers. The hod carrier has almost vanished from the scene and is now probably making better money running a mortar mixer or operating the power hoists which carry the bricks and mortar aloft.

Power Saws and Concrete Mixers

Power saws hasten the construction of forms for concrete buildings, and concrete mixers, fed from elevated bins, mix vast volumes of concrete, the water for which has been automatically measured and added. Quick acting hoists, towers and spouts distribute the material with a high degree of speed and efficiency.

Concrete mixers, today, are doing a titan's share of the nation's building work, when one considers the enormous tonnage which they handle. One of our largest modern buildings required 56,000 tons of sand, gravel and cement and the aggregate used in the smaller buildings would be many hundred times this figure. Of the 137,500,000 barrels of portland cement produced in 1925, a very large quantity went into the smaller buildings.

Residential construction continues to be the biggest item in the national building program—64 per cent by value. And it is here that a more extended use of power tools and machinery can open the way to lower housing costs. The use of power saws and concrete mixers, already begun, is rapidly increasing in this field, with corresponding reductions in cost. But scarcely more than a beginning has been made in this direction. There is need and room for greatly extended use for these and other power devices and efficiency equipment.

Concrete mixers should be used for mixing the concrete which goes into the foundation footings and walls, the basement floor and the outside walks. Enterprising builders may yet find a way to all this concreting at one time, thus releasing the mixer for other work.

There is now a decided tendency towards the more permanent and fireproof forms of house construction. This will undoubtedly greatly increase the use of concrete mixers in the residential field. New forms of wall building machines have come on the market which practically do away with the necessity for forms and allow a rapid rate of progress on wall work of this nature. It is said that one of these machines will construct hollow walls at the rate of a foot per minute, one foot in depth. Theoretically, this would allow completion of the walls of a good sized house in 40 working hours with five men and a mixer crew.

There seems little doubt that new methods will be found to do away with the slow and expensive form work now required on large concrete buildings. Metal forms are now used to some extent and new and better methods of using them may be found which will speed up this work and put it on a par with the erection of steel framing and curtain walls of brick, terra cotta or tile.

A "Race" in Construction

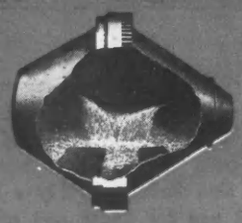
A most interesting race occurred in Chicago about a year ago when the foundation work was started for the Wabash Avenue half of the new Palmer House. On the adjoining lot to the south, work was started at the same time on a 12-story reinforced concrete building for the Hartman Furniture & Carpet Company. The Palmer House foundations were concrete caissons sunk to bed rock, while the smaller reinforced concrete building was set on wood piling driven to resistance and capped with steel and concrete. The Palmer House, it will be remembered, is of steel frame construction with curtain walls of brick and stone facing. Ordinarily, this form of construction goes up much faster than reinforced concrete, which is delayed by the form work.

There was great rivalry between the construction crews working on these two buildings as to which could make the better progress and much chaffing between the men. Each crew tried to beat the other out and some bets were laid on the result. However, a firm of builders having exceptional efficiency on concrete work—the R. S. Wilson Company—had the Hartman contract and beat out their rivals in spite of the troublesome form work. This was quite a notable achievement and was a surprise to those architects and builders who watched the race.

Why You Can Depend

TWENTY-SIX YEARS of mixer building experience are behind every machine that leaves the factory.

Nothing but high grade materials and skilled workmanship are employed in their construction.



Every drum is made of long-wearing and non-breakable boiler plate steel—there is no *cast iron* used in Smith drums.

Famous "end-to-center" mixing action (an exclusive feature of the Smith drum),—insures fast accurate mixing.

Tilt and pour discharge,—for fast emptying and self-cleaning of the drum.

Power for the severest kind of duty.

Rollers turned and keyed to shafts,—renewable bronze bushings—no bearings to babbit in the field.

Power Loader Control Automatic,—no hand knock-out; Skip cannot fall accidentally—brake is automatic.

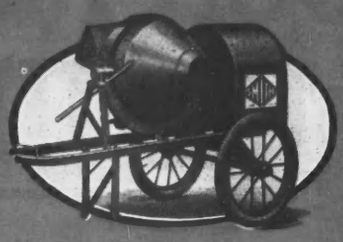
Machine cut gears.

Steel drive pinions.

This high grade construction costs you no more and serves you better and longer.

Ask your nearest distributor for additional information and prices. Send in the coupon today.





The Mascot—2½-S Tilter

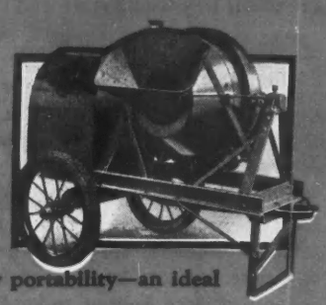
Ideal for the small job and repair contractor—easy and economical to operate—capacity 25 to 45 cu. yds. per day.

Easily portable—weighs only 730 lbs.—can be placed close to cellar windows for direct chuting of concrete for cellar floors and similar work.

Same quality construction as the big Smith Tilters that have been earning fame for the Smith name during the last quarter-century.

Smith 3½-S Tilter

Trailer Type—Low Charger Model



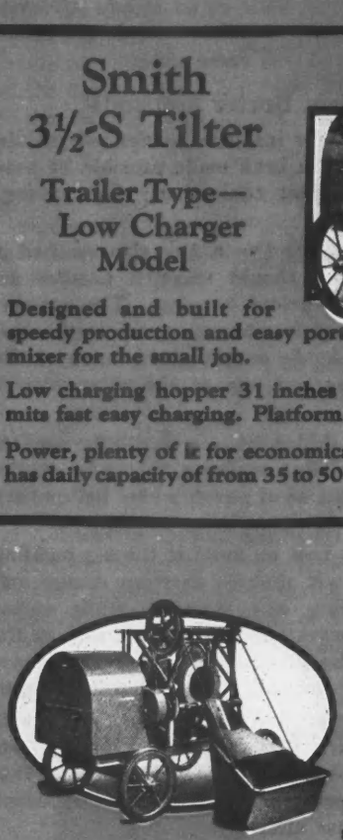
Designed and built for speedy production and easy portability—an ideal mixer for the small job.

Low charging hopper 31 inches wide and 45 inches high, permits fast easy charging. Platform furnished if desired.

Power, plenty of it for economical and dependable operation—has daily capacity of from 35 to 50 cu. yds.—weight only 1,100 lbs.

Smith 3½-S Tilter

With Power Loader



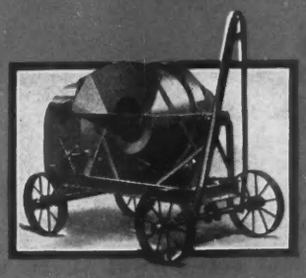
For speedy production on the smaller jobs—easily portable—has capacity of 35 to 50 cu. yds. per day.

Has famous double-cone tilting drum with fast mix and discharge. Plenty of power provided for maximum and dependable production.

Smallest Smith Mixer with power loader. Use of power loader increases capacity 30 per cent. Quality built throughout—weight, with power loader, 1,635 lbs.

SMITH MIXERS

On Smith Mixers



Smith 5-S Tilter

Low Charger Model

A one-bag mixer, especially designed for jobs where uniformity of concrete is specifically demanded.

Holds batch up to 1-2½-4 proportions—has easy one-hand tilt—easy portability. Low charging hopper allows fast, easy charging—platform furnished if desired.

Capacity from 50 to 80 cu. yds. per day—plenty of power—weight 2,150 lbs.

Smith 5-S Tilter

With Power Loader

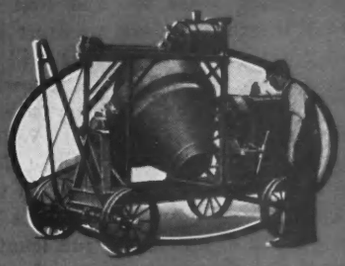


Specially designed for jobs calling for a uniformity of concrete that requires one-bag batches.

Holds a bag batch up to 1-2½-4 proportions—has easy one-hand tilting that can be operated from either side—has easy portability. Plenty of power furnished for the severest kind of duty—daily capacity from 50 to 80 cu. yds.—weight, with power loader, 2,525 lbs.

Smith 7-S Tilter

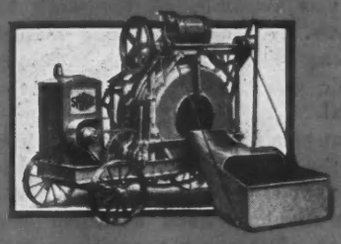
With Power Loader



A one-bag mixer with mixes of all proportions up to 1-3-6. Is easily portable and has capacity of from 70 to 120 cu. yds. per day.

Has easy one-hand tilt from either side—plenty of power for the hardest kind of work—is speedy, dependable, economical.

Can be furnished with power loader or low charging hopper and platform and is easily portable. With feed chute weighs 2,900 lbs., with power loader, 3,490 lbs.



Smith 7-S (one bag) Non-Tilting Mixer

A one-bag mixer of the non-tilting type for use on jobs calling for batches up to 1-3-6 proportions.

Its drum has the famous end-to-center mixing action—the large capacity of the mixing buckets allowing extremely fast discharge. The buckets, being mounted above the drum floor, leave lots of room for scouring and self-cleaning.

Can be equipped with low charge hopper or Power loader. Is furnished with automatic measuring water tank and gasoline, electric or steam power. Capacity, 70 to 120 cu. yds. per day.

The T. L. SMITH COMPANY

1026 32nd Street

MILWAUKEE, WISCONSIN

Complete specifications may be had for the asking. Send for catalog No. 500.

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Efficiency in Using the Power Saw for Framing

Article No. 1—Planning the Job in Advance Is Necessary

By JOHN T. NEUFELD

Editor's Note.—This is the first of two articles on this live subject by Mr Neufeld. The second will appear in the May issue.

IN OUR desire to give some practical information to the builder on the use of woodworking machinery in connection with the framing of buildings, we must be guided by what we have found from practical experience to be the real need. The instruction needed in this kind of work is best stated by the two following illustrations.

On a grain elevator job where much of the frame material was 2 by 8-inch and 2 by 10-inch lumber all the framing material was figured and detailed in advance and cut to the proper lengths and sizes before any actual framing was done. The work was only handicapped because no power saw was available, all the work had to be cut with hand saws. After the framing material was all cut in proper lengths it was put up in a very short time and no trouble was caused because of wrong lengths or miscut material.

The second job was that of a big concrete grain elevator where a great deal of the frame work and also inside floors, etc., was of lumber. Here a power saw was placed at the disposal of the workmen. Each workman could use the saw as he saw fit. Whenever a certain number of pieces had to be cut the motor was turned on and the saw did the cutting. This power saw saved labor as hand sawing was not required, but it was used very inefficiently.

If the planning that was done on the first job and the power saw on the second job had been combined then efficient work would have been the result. These two illustrations show us that when using a power saw or any expensive equipment on the job a little more planning in advance must be done. It is not so much the question of using the machinery the proper way, although this must also be considered, but it is a matter of planning your work ahead.

Many people will tell us this cannot be done as framing a building is a job that must be done as you go along. To these we would only reply that present large structural steel buildings are cut entirely in the shop and assembled on the job, that automobiles are built in pieces and assembled by different men and that even a suit of clothes in the clothing factories is made by many different workers; one does the cutting and the other the putting together. Any of these three examples given is more complicated than the cutting and framing of a building.

How to Plan in Advance

In this article we will explain two different ways of solving the problem of cutting the material with the power saw, and assembling it after cutting.

The first method is to work out approximately (as the carpenter will generally do) the number of joists in the floor, the number of studs, the number of rafters, headers for windows, etc., cutting all this material that can be figured without much effort and leaving the irregular lengths to be cut by hand saws.

The second method is the piece billing method. The second method will call for a complete framing detail and a piece bill of all the material required. This would be similar to the shop drawings made for steel work.

Referring to the first method named let us assume that we wish to figure the material for a small house in advance so that the larger portion of it may be cut with a power saw.

We would figure in the same manner as the carpenter does the length of the joists and the number required figuring 3 joists for every 4 feet when the joists are spaced 16 inches O. C. but allowing for openings in the floor, because where openings occur full length joists are not needed.

When figuring studs we find that many of the studs are not full length, therefore, we must decide approximately how many are full length. This will vary with the construction of the house but the following will help us to decide. For windows of ordinary size, as shown, 2 studs, sometimes 3 are not full length. Where double windows are required 4 or 5 studs are not full length. In the framing detail shown on page 521 10 full length studs are used. This is one for every two feet in length of wall. This gives us an idea of how many full length studs to cut.

We may also figure approximately the number of short studs above and below the windows. For example: A house having 8 ordinary size windows and 3 outside doors has 11 times 2=22 (approximately) short studs (that is studs that are not full length). The length of these studs can easily be determined if we figure the size of openings. The carpenter who is accustomed to this can do it accurately. Thus for openings for double hung windows we generally add 11 or 12 inches to get the length of the opening. If double headers are required 3¼-inch allowance must be made at the top and bottom.

The headers at the top and the bottom may also be cut beforehand. These can be cut to fit either between 3 or 4 studding as the case may be. Having studding spaced 16 O. C. and the window requiring an opening of 3 feet or more we know that headers will have to be cut the same length as 3 studding spaces less the thickness of 1 stud. Headers cut in this way will fit for nearly all cases especially if a little calculations are made as to what position the window will have in regard to the studs. A better job, of course, can be done by drawing a job detail. This will be explained later.

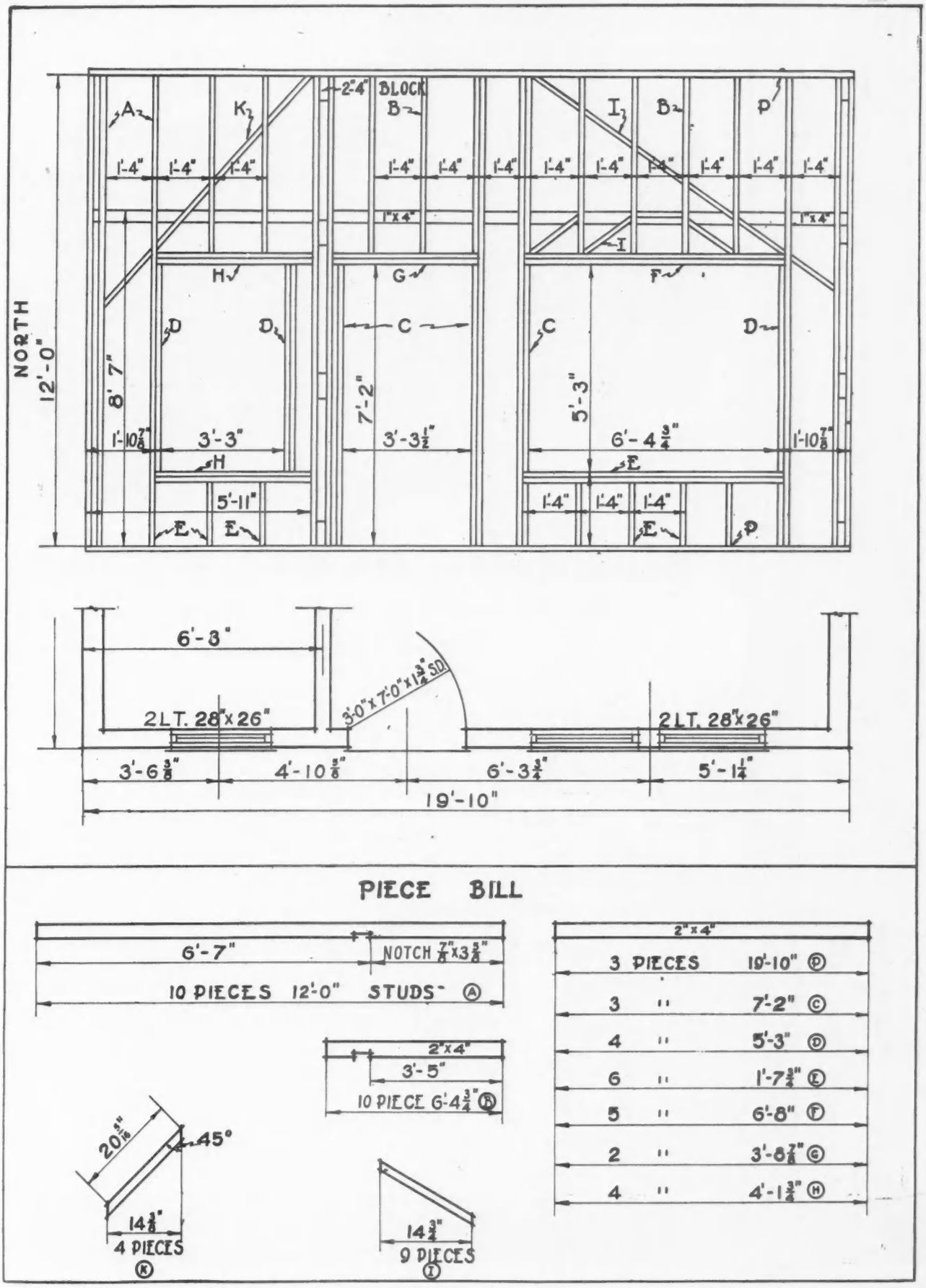
The side pieces shown by (D) on the drawing can easily be cut to the required length as they are the exact length of the opening. The height of the top of the window is generally fixed by the drawings.

A good plan is to cut the studs above the windows to the required lengths for the entire building, also the headers and the side pieces for the window openings, leaving the short studs below the windows to be cut when the frame is nailed together. This method I have found to work out very satisfactorily even where no framing plans were drawn up.

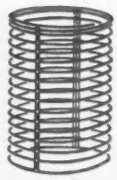
The Piece Billing Method

The second method which we recommend for all jobs of any importance is to draw up complete framing details of the floors, walls, roofs, etc., and to make out a piece bill for the men operating the saw. This method is

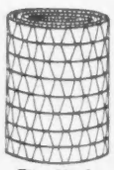
(*Continued to page 611*)



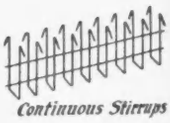
This Sketch Shows How to Use the Floor Plan for Making a Framing Detail and Drawing Off a Piece Bill. With this piece bill, the men at the power saw can most efficiently cut the necessary pieces.



Spirals



Wire Mesh



Continuous Stirrups



Steel Sash



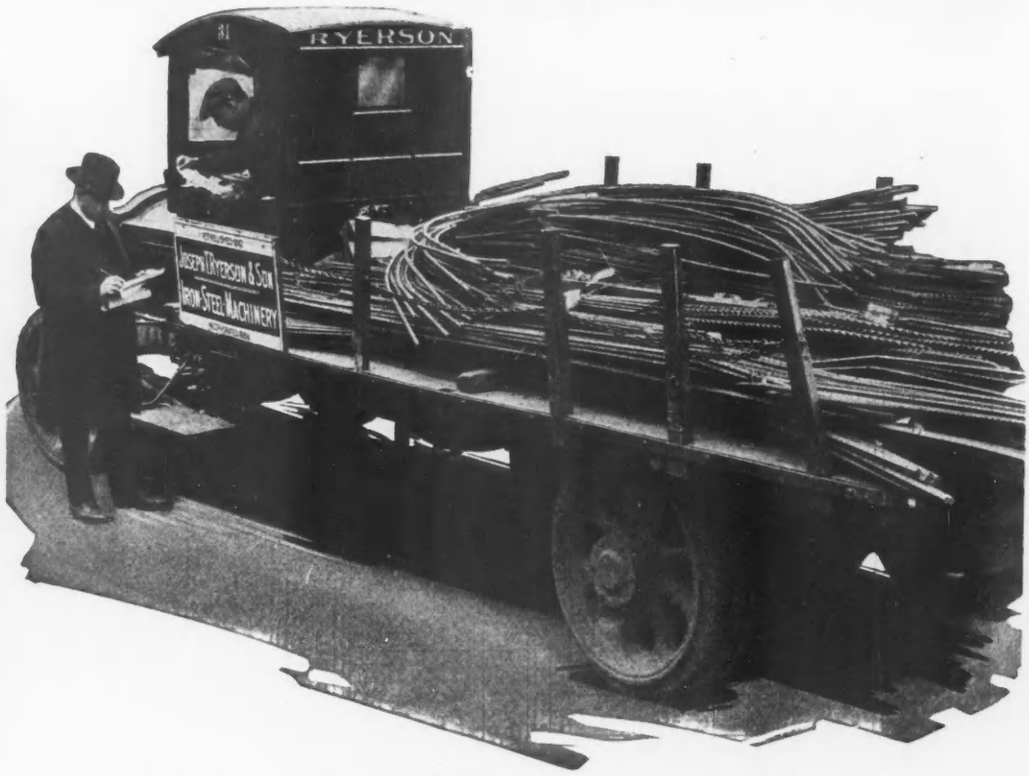
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Design and Equipment Important in Concrete Products Plants

THE plan shown on page 524 is an excellent one for the installation of a small concrete products plant. It might equally well be designated a medium size plant, as it is small only in comparison with the larger plants, some of which reach an output of 25,000 units per day.

The plan shown is a recommended design prepared by the Portland Cement Association. It is designed for one block or tile machine, with floor space provided for a future additional machine.



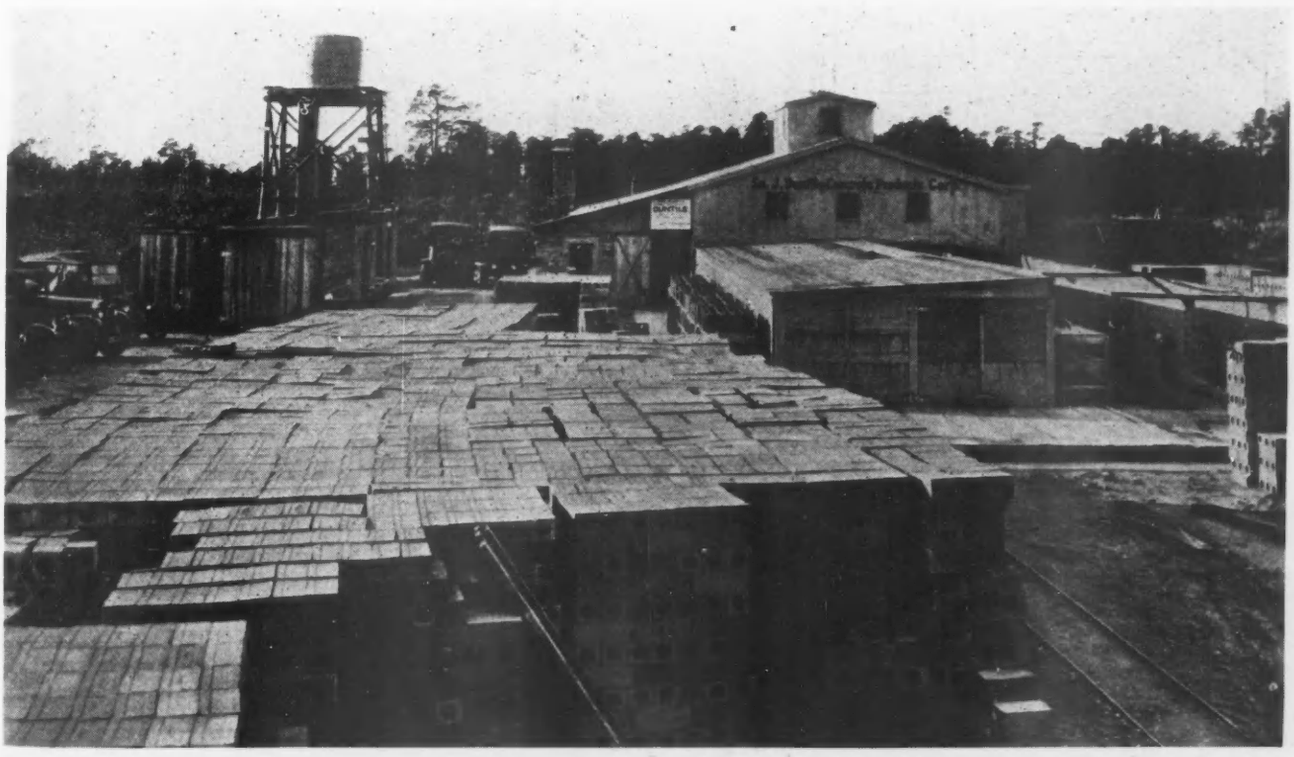
Motor Trucks Are Indispensable Equipment for the Delivery of Concrete Blocks and Tile.

It will be noticed, by reference to this plan, that the aggregate bins are on the same level as the machine, but the mixer is placed entirely below this level, with a skip or bucket elevator to raise the mixture for gravity feed into the machine. The reason that elevated aggregate bins are not recommended for this plan is primarily due to the small size of the plant. Undoubtedly, the elevated aggregate bins are more efficient and economical for a larger plant. The mixer and water measuring device can then be placed on a second floor level above the machines and feed from the mixer by gravity into the machine on the ground floor level. But when this is done, an extra man is required at the concrete mixer, whereas, with the floor plan shown, one man can operate both mixer and machine.

The normal output of the concrete products plant shown on the plans is 1,200 8 by 8 by 16-inch concrete block or 3,000 5 by 6 by 12-inch concrete tile working with one machine on a nine-hour shift in cold weather. After the cold weather has passed and when the rush building season is on, a plant of this description will often be operated two nine-hour shifts per day, which will practically double the output. The curing chambers have sufficient capacity to take care of this output because, in the warmer weather, the curing time can be cut in half.

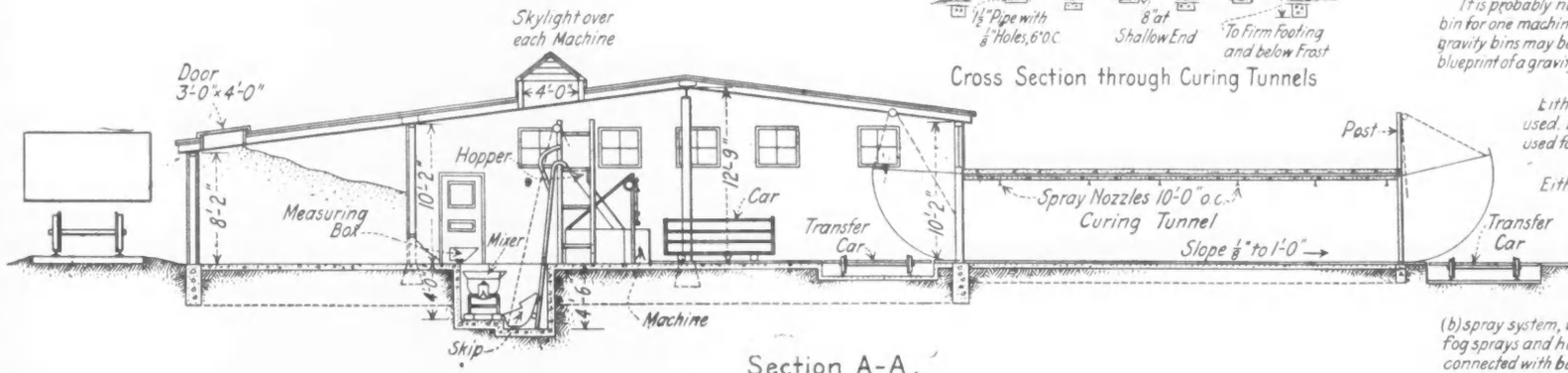
In cold weather, the recommended curing time is 48 hours at 125 degrees temperature and all the humidity obtainable from a fog or mist of steam. In warmer weather, when there is a peak demand for concrete block and tile, 24 hours' curing time will be sufficient.

There are many important items of equipment, one of the

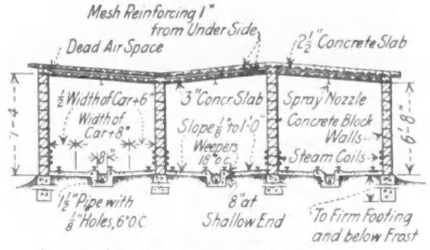


This Is a View of a Very Successful Concrete Tile Plant, the South Jersey Duntile-Concrete Products Corporation, Somers Point, N. J., with a Large Stock of Its Product Shown in the Foreground.

SUGGESTED LAYOUT FOR SMALL CONCRETE PRODUCTS PLANT



Section A-A.



Cross Section through Curing Tunnels

— GENERAL NOTES —

This Plan is designed to show a satisfactory arrangement for a single large block or building tile machine with provision for a second machine as soon as business requires it. With this arrangement it is possible to handle materials very economically. All materials move in a straight line thru the plant

Material Storage

It is probably not economical to install gravity storage bin for one machine. When two machines are in operation, gravity bins may be more economical. (You can obtain a blueprint of a gravity storage bin from us upon request.)

Mixer

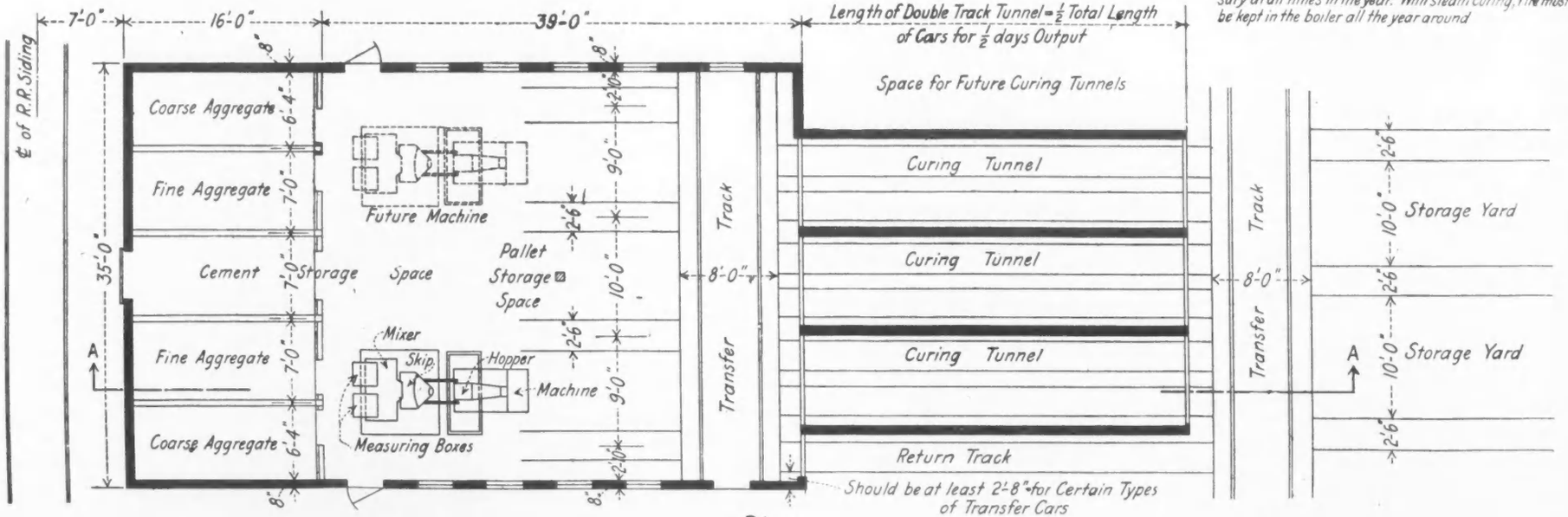
Either batch or continuous mixer may be used. Batch skip or bucket elevator can be used for elevating materials to machine.

Cars.

Either jack lift trucks or cars on industrial tracks can be used for moving block

Curing.

Two systems of curing are shown. (a) steam curing, where heat and moisture are obtained by bubbling the "live" steam thru a trough of water and (b) spray system, where moisture is obtained by means of fog sprays and heat obtained by radiation from steam pipes connected with boiler. In summer frequently the heat is not needed. With the fog spray system the heat can be turned off without reducing the amount of moisture which is necessary at all times in the year. With steam curing, fire must be kept in the boiler all the year around.



Plan.



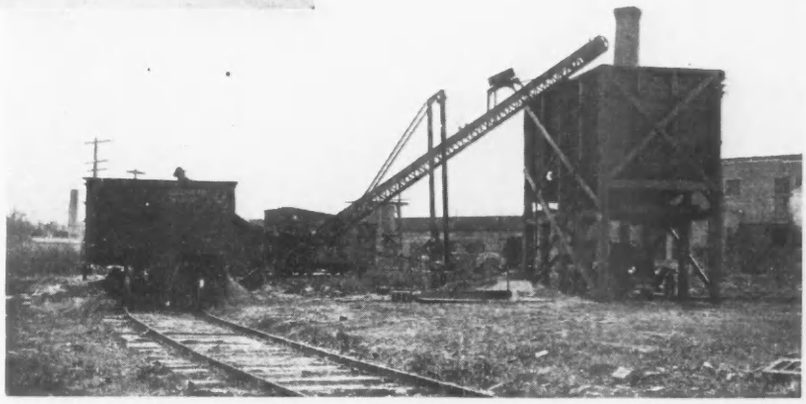
Plant of the Springfield Cement Products Company at Springfield, Ohio, Showing Paved Yard and Jack Lift Truck with Which the Blocks Are Handled.

most important being concrete mixers. A good mixer is essential, not only to secure a good mix, but also because any breakdown at the mixer will also shut down the molding and tamping machinery.

Selection of a good block or tile machine is doubly important, as it must be made both from the standpoint of efficiency in operation and salability of the product. In other words, the shape of the block and its appearance are important and the service it will give in the wall depends almost as much on its design as upon the excellence of the concrete and its molding.

Conveying and handling machinery are also efficiency factors and become increasingly so the larger the plant. The overhead storage bin is the ideal arrangement for all but the smaller plants and here an automatic loader is advisable, to take the aggregate from railroad cars or ground level up into the bins.

Overhead conveyors or belt conveyors at a lower level can often be used to advantage. Industrial tracks and cars which run into the curing tunnels and out to the storage yards are often a good



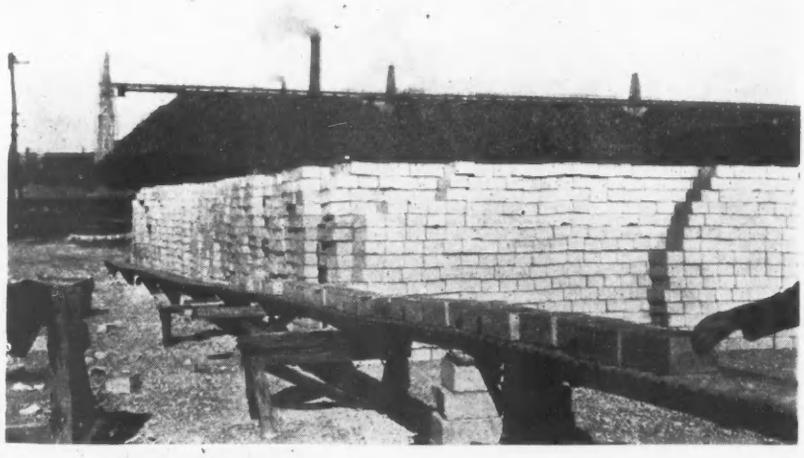
Elevated Aggregate Bins and Automatic Loader Make Possible the Efficiency of Gravity Feed Throughout the Plant. This view was taken at the plant of the Best Block Company, Milwaukee, Wis.



The Elimination of Waste Space in Curing Tunnels Makes a Direct Saving in the Amount of Steam Heat Required. These tunnels at the tile plant of the Superior Sand & Gravel Company, Detroit, Mich., are just long enough and high enough to admit the loaded cars.

method of handling, but many plant owners prefer concrete pavements in the yard and jack-lift trucks as a method of handling the blocks. There are points in favor of all these systems in various types and sizes of plant layout.

Great improvements have recently been made in pallets, which can now be secured in several rigid metal types. If there is any give or deflection to the pallet, it often results in distorted blocks or invisible cracks in the green blocks which are afterwards a source of weakness. Several hundred pallets are required, even in the smaller plants, and the larger ones require several thousand.



View at the Delta Brick & Tile Company's Plant, Detroit, Mich., Showing Belt Conveyor in Use Bringing Concrete Blocks to the Storage Yard.



Bucket Conveyor and Gravity Chute Handling Aggregate at the Plant of the Steward-Silver Company, Columbus, Ohio. This method shows efficiency in some plants.

Motor trucks, of course, are essential for delivery and here there is a wide range of choice. They are used either with or without trailers or semi-trailer bodies. The ability to back in to a job where the ground is often rough or soft is a factor which sometimes militates against the use of trailers.

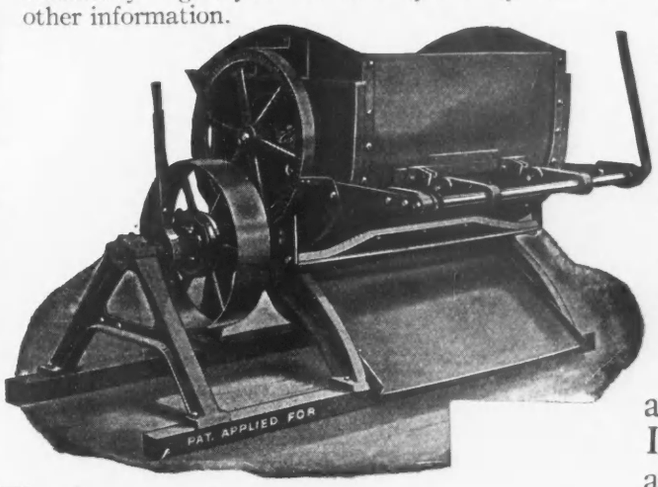
In addition to the concrete product specialists in the large cities, an increasing number of building material dealers and contractors are installing concrete products plants in the smaller cities.



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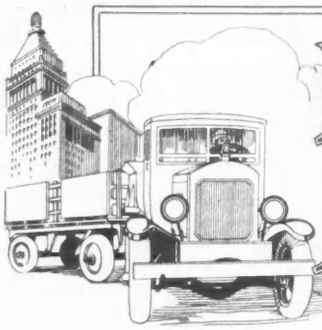
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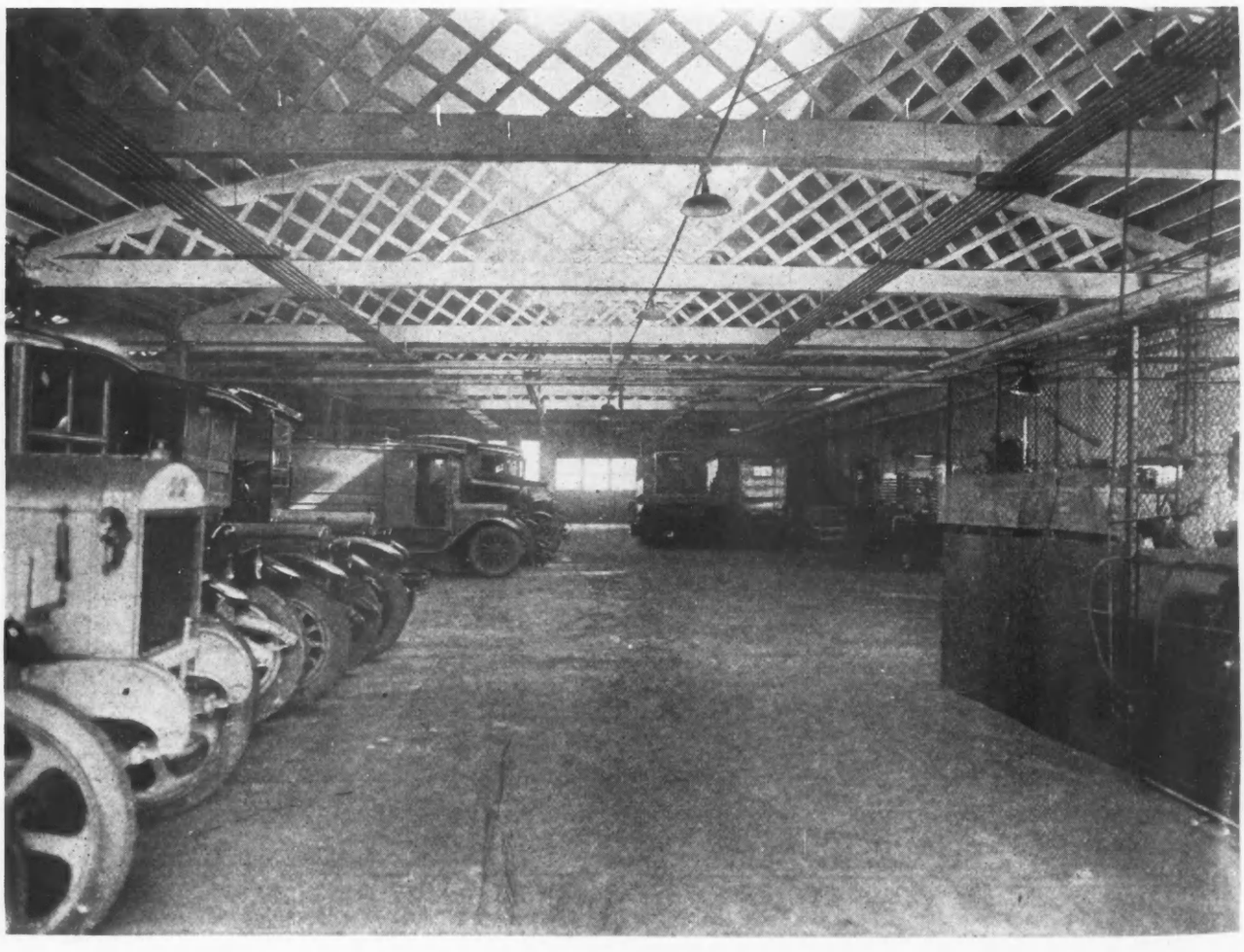
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(*Continued to page 538*)



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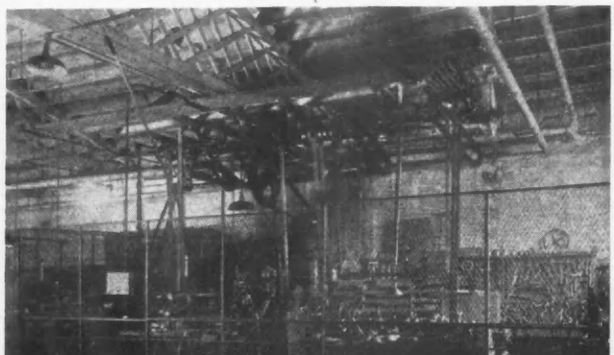
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That feller with a fleet o' Fords (with Warford transmissions) is laying concrete so fast these days—they wouldn't need detours around him if they was only a machine to dry it up as quick as he puts it down.

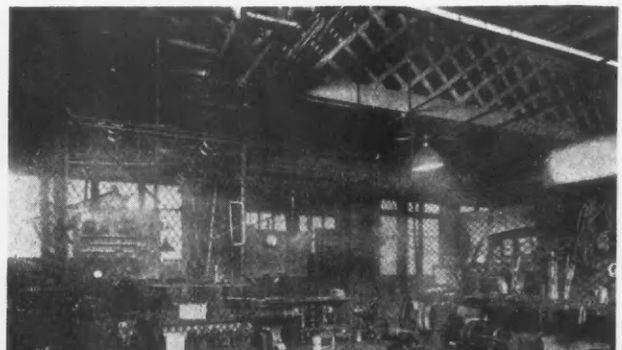
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Here Is the Machine Shop Seen at the Left of the Picture on Page 534. It is fully equipped with tools which are always in first class condition.



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for square dealing, you may feel prtty confident that your truck will be kept running with the least possible loss of time.

Of course not everyone has enough knowledge of automobile repair work to known shop equipment thoroughly, but if the dealer is willing and pleased to show you his shop and explain his equipment for repair work, it will not be hard to judge whether or not he is well equipped. A dealer who holds back about showing his facilities is pretty likely to be poorly equipped, while a dealer with good equipment is glad to show and explain it as a closing argument in his sales talk.

Then, too, there is the general appearance of the department, which is a fairly accurate guide to the kind of work which it does. If the shop is well lighted, clean and neat, the machines kept in good condition and the tools well cared for and carefully put away to prevent loss or damage when not in use, you may feel confident that here is a well managed shop, a department which takes pride in its work and practices economy in doing it.

On the other hand, a shop that is slovenly usually does slovenly work. Poor lighting, dirt and disorderliness never go with good workmanship. Neglected tools mean damage and loss, poorly cared for machinery means rapid depreciation. Both mean poor work and high costs and these high costs always come back onto the customer in the form of excessive bills and poorly done work, which must soon be done over again or which even does actual damage to the truck.

Then there is the shop which is kept neat and trim but lacks sufficient equipment. You can spot such a shop by asking the service manager to explain the equipment for doing the more important repair jobs. If it is all hand work you may be sure the labor charges will be high. Nor should this question of labor charges be overlooked. One good indication of a modern shop is the use of flat rate charges for maintenance work. Not all good shops use the flat rate system, but wherever this system is found you are pretty sure to find a good shop and the chances for being overcharged are small.

Another aid in judging the service department is the shop morale. Any contractor should be able to tell by the atmosphere of a shop whether the men are taking an interest in their work, giving a dollar's worth of effort for a dollar's worth of time; or if they are just drifting along doing things any old way and running up the overhead by loafing whenever they get the chance. Idle time in a truck repair department is just as expensive as it is on a building job and it is the man whose truck is being repaired who has to pay for it too.

One other point is worth considering. Has the shop a service car which is equipped to come to your aid in that emergency which is so likely to occur just at the wrong time when you are most in need of the full use of your truck? There are many kinds of service cars running all the way up the line to the elaborate truck shown in the illustration. This service truck is almost a complete service station in itself. The sides of the body open down forming shelves and giving access to tools, spare parts and supplies of all kinds, and forming a work bench equipped with vise and other accessories. As the rear a drawer pulls out in which are kept the larger and heavier tools and parts. When this truck answers an emergency call it is equipped to make a large number of common repairs, and only in case of a wreck or when power machines are required is it necessary to take the disabled truck into the service station.



Not All Service Stations Are Big Enough to Support a Service Truck Like This but Any Service Station Should Provide a Service Car to Take Care of Emergency Calls.

Power Saws for Framing

(*Continued from page 520.*)

similar to the method used by steel shops and also by millwork men in cutting out inside finishing material for the house.

The plate on the preceding page illustrates a part of the floor plan and framing detail above and shows how we may use the floor plan to draw up the framing detail. Only one wall is detailed here but this will be sufficient to illustrate the method. In this detail the lengths of the studs, the height and width of openings and the spacing of studs should be accurately shown so that this detail will not only help in cutting the material but also help in framing the building.

The argument might be given that making such a detail will require considerable amount of work. However, we have found that the carpenter in laying out openings on a job where no framing details are given will waste a lot of time doing this work and very often the openings are not very accurate after they are laid out on the job. A framing detail of this kind may require a little more extra time in the office, but it will certainly save a lot of time and avoid errors on the job, providing, of course, that the detailer knows his business.

After such a framing detail is made then a bill of material, or what might be termed a "piece bill," is made out. This "piece bill" is for the man operating the saw. Such a "piece bill" is illustrated on the accompanying drawing. Here the different pieces are illustrated by a sketch and the dimension lines indicate the length. The sketches do not have to be to any scale as dimensions and sizes should be indicated by figures, as shown.

The extra cuttings, such as for the ribbon board for the studs, should be described by notes.

Where a number of pieces of the same nature but of different lengths are required one sketch only is necessary, but different dimension lines are given to show the different lengths. The longest piece should be dimensioned first so that the extension table may be set for a long piece and drawn in for the shorter pieces.

The pieces for the sills and plates are indicated on this bill as 19 feet 10 inches long; of course, this does not mean that such lengths must be used. The sawyer must use two pieces that will make the total dimensions indicated.

The bracing is also detailed here, this may be detailed by giving the true length of the piece or by giving the horizontal distance that the piece extends together with the angle. The angle may be given in degrees or by stating the rise per foot run, as for rafters. Usually braces are set at 45 degrees and as the spacing of studs is standard most of the bridging can be cut to standard lengths.

The suggestions given here, of course, cannot be applied to every job directly, but should be used only as suggestions to work from. The method of detailing and piece billing the material for a roof will be taken up next.

✣

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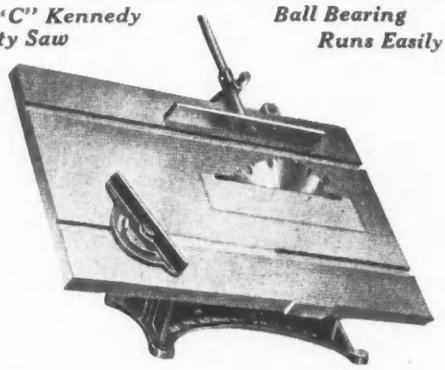
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HANDY REFERENCE DATA

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Handy Reference Data

Table of Weights of Pine Joists, Studs and Rafters Based on a Weight Per Board Foot of 2.8 Pounds

Spacing	Size	Weight per Sq. Foot	Size	Weight per Sq. Foot	Size	Weight per Sq. Foot
12″	2″x4″	1.87	2″x6″	2.8	2″x8″	3.74
14″	"	1.60	"	2.4	"	3.20
16″	"	1.40	"	2.1	"	2.80
18″	"	1.25	"	1.87	"	2.50
20″	"	1.12	"	1.68	"	2.24
22″	"	1.02	"	1.53	"	2.04
12″	2″x10″	4.68	2″x12″	5.61	2″x14″	6.55
14″	"	4.00	"	4.80	"	5.60
16″	"	3.50	"	4.20	"	4.90
18″	"	3.13	"	3.75	"	4.38
20″	"	2.80	"	3.36	"	3.92
22″	"	2.55	"	3.06	"	3.57

Weights of Partitions

	Lbs. per sq. ft.
Gypsum partition blocks 3″ thick	10
" " " 4″ "	12
" " " 5″ "	14
" " " 6″ "	16
Plaster on brick, tile or concrete	5
Partition Tile 3″ thick	17
" " 4″ "	18
" " 6″ "	25
" " 8″ "	31
" " 10″ "	35

Weights of Ceiling

	Lbs. per sq. ft.
Lath and plaster, 2 coats	9
Lath and plaster, 3 coats	10
Suspended ceiling (metal lath and steel ties)	10

Weights of Sheathing, Flooring, Etc.

	Lbs. per sq. ft.
Pine, Hemlock, Spruce, Poplar, Redwood, per inch thick	3
Chestnut, Maple, Birch, Oak	4

Weights of Building Materials, Stacked

	Lbs. Per Cu. Ft.		Lbs. Per Cu. Ft.
Brick—Pressed	150	Glass—Window	157
Brick—Common	125	Granite	170
Brick—Soft	100	Lime—Quick	53
Cement—Portland	100	Plaster of Paris	70
Cement—Rosedale	56	Sand	90–106
Cinders—Dry	72	Sandstone	151
Cinders—Packed	90	Shale	162
Earth—Dry, Shaken	82– 92	Slate	175
Earth—Rammed	92–100	Trap Rock	187

Weights of Building Materials in Construction Roofing

	Lbs. Per Sq. Ft.		Lbs. Per Sq. Ft.
Copper—Sheet	0.75 to 1.25	Shingles—Wood 16″	2
Felt and Gravel	2 to 10.0	Slate—Average	10
Iron—Corrugated	1 to 3.75	Tile—Fancy, Laid in Mortar	25 to 30
Iron—Galvanized	1 to 3	Tile—Plain, Average	12
Iron—Sheet, black ptd.	1.5	Tin and Paint	1
Ready Composition Roofing	1 to 1.5	Zinc	1 to 2
Sheet Lead	4 to 8		

Weights of Building Materials in Construction Masonry

	Lbs. Per Cu. Ft.		Lbs. Per Cu. Ft.
Brick—Pressed or Paving	150	Granite	170
Brick—Hard, Common	125	Mortar and Plaster	120
Brick—Soft	100	Rubble—Limestone, Common	140
Brick—Hollow	90	Rubble—Limestone, Cut Face	150
Concrete—Stone	150	Rubble—Sandstone, Common	140
Concrete—Cinder	96	Rubble—Sandstone, Cut Face	150

Weights of Building Materials in Construction Floors

	Lbs. Per Sq. Ft.		Lbs. Per Sq. Ft.
Flat Arches—Tile, 3″ thick	17	Flat Arches—Tile, 12″ thick	39
Flat Arches—Tile, 4″ thick	18	Flat Arches—Tile, 14″ thick	43
Flat Arches—Tile, 6″ thick	25	Flat Arches—Tile, 16″ thick	49
Flat Arches—Tile, 8″ thick	31	Book Tile, 2″ thick	15
Flat Arches—Tile, 10″ thick	35	Book Tile, 3″ thick	17
Brick Arches, 4″ thick, and Concrete	70	Beam Tile	15

Weights of Building Materials—Dry Woods

	Pounds Bd. Ft.	Cu. Ft.		Pounds Bd. Ft.	Cu. Ft.
Ash, American White	3.9	47	Larch, Western	3	36
Birch	3.9	47	Mahogany, Honduras	2.9	35
Beech	3.7	44	Mahogany, Spanish	4.4	53
Boxwood	5	60	Maple	4.1	49
Cedar, American	2.9	35	Maple, soft	3.5	42
Cedar, Pt. Orford	2.6	31	Oak, Live	4.9	59
Cedar, Incense	2	24	Oak, Red	3.9	47
Cedar, Western Red	2	24	Oak, White	4.3	52
Cherry	3.5	42	Pine, Southern	3.7	44
Chestnut	3.4	41	Pine, Sugar	2.2	26
Cork	1.3	16	Pine, Western White	3.3	40
Elm	2.9	35	Pine, White	2.1	25
Fir, Douglas	2.8	34	Pine, Yellow	2.8	34
Hemlock	2.1	25	Pine, Western Yellow	2.4	29
Hemlock, Pacific	2.6	31	Spruce	2.1	25
Hickory	4.4	53	Spruce, Sitka	2.2	26
Larch	3	36	Sycamore	3.1	37
			Walnut	3.2	38

Turning Diameter of Automobiles

The table below gives the minimum turning diameters of certain models of various makes of cars. By minimum turning diameter we mean the diameter of the smallest walled in circle in which a car can turn completely around.

These figures were furnished by the automobile manufacturers. This data will give an idea of the types of cars which could be handled in garages of limited width:

Make	Overall Length	Minimum Turning Diameter
Chevrolet	12′ 5″	37′ 0″
Franklin	15′ 0″	38′ 0″
Ford	12′ 1″	38′ 6″
Buick	13′ 10″	41′ 6″
Jewett	14′ 8″	43′ 0″
Nash	15′ 11″	43′ 6″
Jordan	16′ 2″	44′ 0″
Cadillac	16′ 9″	44′ 0″
Paige	16′ 6″	45′ 0″
Hupmobile	14′ 5″	45′ 0″
Studebaker	16′ 5″	45′ 5″
Dodge	13′ 9″	47′ 0″
Stutz	16′ 2″	52′ 6″
Lincoln	17′ 0″	53′ 0″
Packard	17′ 2″	54′ 0″

Building Code Requirements for Live Floor Loads in Various Cities

In Pounds per Square Foot

	Baltimore	Boston	Buffalo	Chicago	Cincinnati	Indianapolis	Milwaukee	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Washington
Apartments	60	50	70	40	40	50	30	50	40	.....	70	.....	50	60	40	50
Assembly Halls	.....	.....	100	100	100	125	.....	125	.....	100	120	150	100	.....	.....	.....
Dwellings	60	50	40	40	40	50	30	50	40	40	70	70	50	60	40	50
Hospitals	.....	.....	70	50	.....	50	30	50	.....	.....	70	.....	50	60	50	.....
Hotels	60	.....	70	50	40	75	30	50	40	.....	70	.....	50	60	40	50
Manufacturing	175	.....	.....	.....	150	200	.....	.....	.....	.....	150	200	150	250	.....	.....
Light Manufacturing	125	125	120	100	100	100	100	100	125	.....	120	.....	100	125	125	.....
Heavy Storehouses	250	250	.....	.....	150	200	.....	.....	.....	.....	150	.....	.....	250	.....	150
Warehouses	.....	250	150	.....	150	200	.....	.....	200	.....	150	200	150	250	.....	150
Offices	75	100	70	50	50	75	40	75	70	60	100	.....	60	60	50	75
Schools—Class Rooms	75	60	.....	.....	60	100	40	100	60	75	.....	.....	75	75	50	75
Stairways, General	.....	70	.....	100	80	.....	60	.....	70	.....	.....	.....	.....	.....	100	.....
Roofs—Slope Under 20°	.....	40	40	25	25	30	30	50	30	40	30	50	30	30	40	25
Wind Pressure	30	.....	30	20	20	.....	30	30	.....	30	30	.....	30	20	.....	30

Covering Capacity of Shingles

Exposure to Weather Inches	Number of Square Feet of Roof Covered by 1,000 Shingles 4" wide	6" wide	Number of Shingles Required for 100 Square Feet of Roof 4" wide	6" wide
4	111	167	900	600
4¼	118	177	847	565
4½	125	188	800	534
5	139	208	720	480
5½	153	230	650	437
6	167	250	600	400
7	194	291	514	343
8	222	333	450	300

Some allowance must be made for waste but as no two jobs are identical in this respect, the builder must add his own allowance for waste.

Number of Lath in Plaster Work

14 lath are required per square yard.

Working Strength of Various Building Materials*

Compression (Direct)

STEEL AND IRON

The safe carrying capacities of various building materials (except in case of columns) are as follows: The strength given being the working strength in pounds per square inch of section.

Rolled steel	16,000
Cast steel	16,000
Wrought iron	12,000
Cast iron (in short blocks.)	16,000
Steel ribs and rivets (bearing)	20,000
Wrought iron pins and rivets (bearing)	15,000

TIMBER

	With Grain	Across Grain
Oak	900	800
Yellow pine	1,000	600
White pine	800	400
Spruce	800	400
Locust	1,200	1,000
Chestnut	500	1,000
Hemlock	500	500

CONCRETE

Concrete (Portland) cement, 1; sand, 2; stone, 4	230
Concrete (Portland) cement, 1; sand, 2; stone, 5	208
Concrete (Rosedale, or equal), cement, 1; sand, 2; stone, 4	125
Concrete (Rosedale, or equal), cement, 1; sand, 2; stone, 5	111

STONEWORK

Rubble stonework in Portland cement-mortar	140
Rubble stonework in Rosedale cement-mortar	111
Rubble stonework in lime- and cement-mortar	97
Rubble stonework in lime-mortar	70

BRICKWORK

Brickwork in Portland cement-mortar; cement, 1; sand, 3	250
Brickwork in Rosedale, or equal, cement-mortar, cement, 1; sand, 3	208
Brickwork in lime and cement-mortar, cement, 1; lime, 1; sand, 6	160
Brickwork in lime-mortar; lime, 1; sand, 4	111

* The stresses given in these tables are those recommended by the National Board of Fire Underwriters.

Nails—Size, Gauge and Number Per Pound

Name	Length, Inches	Gauge	No. per Lb. (Varies)
2d	1	15	876
3d, Fine	1⅛	15½	600
3d, Common	1¼	14	568
4d	1½	12½	316
5d	1¾	12½	271
6d	2	11½	181
7d	2¼	11½	161
8d	2½	10¼	106
9d	2¾	10¼	96
10d	3	9	69
12d	3¼	9	63
16d	3½	8	49
20d	4	6	31
30d	4½	5	24
40d	5	4	18
50d	5½	3	14
60d	6	2	11

Standard lengths are the same for wire and cut nails.

Safe Loads in Tons of 2,000 Pounds for Square Wooden Columns

Unsupported Length of Column in Feet	Size of Columns in Inches 6x6	8x8	9x9	10x10	12x12	14x14	16x16
WHITE PINE OR SPRUCE							
6	12.80	...	...	...	...	...	...
8	11.70	22.7	29.6	...	...	...	...
10	10.60	21.3	28.0	35.5	...	...	...
12	9.54	19.8	26.3	33.7	51.1	...	...
14	8.46	18.4	24.7	31.9	49.0	69.6	...
16	7.38	17.0	23.1	30.1	46.8	67.0	91.0
18	....	15.5	21.5	28.3	44.7	64.4	88.0
20	....	14.1	19.8	26.5	42.5	62.0	85.2
22	....	...	18.2	24.7	40.3	59.5	82.3
24	....	...	...	22.9	38.2	57.0	79.4
WHITE OAK							
6	14.80	...	...	...	...	...	...
8	13.50	26.2	34.0	...	...	...	...
10	12.50	24.6	32.4	41.0	...	...	...
12	11.00	22.7	30.4	39.1	59.1	...	...
14	9.73	21.1	28.4	36.7	56.9	80.4	...
16	8.64	19.5	26.5	34.6	54.0	77.8	105.0
18	....	17.8	24.7	32.4	51.1	74.5	102.0
20	....	16.3	22.7	30.5	49.1	71.3	98.5
22	....	...	21.1	28.2	46.1	68.3	94.7
24	....	...	...	26.4	43.9	65.5	90.9
YELLOW PINE (Southern)							
6	18.0	...	...	...	...	...	...
8	16.4	32.0	41.6	...	...	...	...
10	14.9	29.9	39.4	50.0	...	...	...
12	13.3	27.8	36.9	47.6	72.0	...	...
14	11.9	25.8	34.7	44.7	69.1	98.6	132.0
16	10.4	23.7	32.3	42.3	65.5	94.6	128.0
18	....	21.8	30.0	39.5	62.6	90.7	124.0
20	....	19.8	27.8	37.0	59.8	86.9	120.0
22	....	...	25.7	34.6	56.2	83.6	115.0
24	....	...	...	32.2	53.3	80.0	111.0

Safe Loads Uniformly Distributed for Rectangular Spruce or Pine Beams One Inch Thick

The following table has been calculated for extreme fibre stresses of 750 pounds per square inch corresponding to the following values for moduli of rupture recommended by Prof. Lanza, viz:

Spruce and white pine ..... 3,000 lbs.
Oak ..... 4,000 "
Yellow pine ..... 5,000 "

For oak increase values in table by 1/3. For yellow pine increase values in table by 2/3.

The safe load for any other values per square inch is found by increasing or decreasing the loads given in the table in the same proportion as the increased or decreased fibre stress.

1" thick Span in Feet	Depth of Beam 6 Ins.	7 Ins.	8 Ins.	9 Ins.	10 Ins.	11 Ins.	12 Ins.	13 Ins.	14 Ins.	15 Ins.	16 Ins.
5	600	820	1,070	1,350	1,670	2,020	2,400	2,820	3,270	3,750	4,270
6	500	680	890	1,120	1,390	1,680	2,000	2,350	2,730	3,120	3,560
7	430	580	760	960	1,190	1,440	1,710	2,010	2,330	2,680	3,050
8	380	510	670	840	1,040	1,260	1,500	1,760	2,040	2,340	2,670
9	330	460	590	750	930	1,120	1,330	1,560	1,810	2,080	2,370
10	300	410	530	670	830	1,010	1,200	1,410	1,630	1,880	2,130
11	270	370	490	610	760	920	1,090	1,280	1,490	1,710	1,940
12	250	340	440	560	690	840	1,000	1,180	1,360	1,560	1,780
13	230	310	410	520	640	780	930	1,080	1,260	1,440	1,640
14	210	290	380	480	590	720	860	1,010	1,170	1,340	1,530
15	200	270	360	450	560	670	800	940	1,090	1,250	1,420
16	190	260	330	420	520	630	750	880	1,020	1,180	1,330
17	180	240	310	400	490	590	710	830	960	1,100	1,260
18	170	230	290	370	460	560	670	780	910	1,040	1,190
19	160	210	280	360	440	530	630	740	860	990	1,130
20	150	200	270	340	420	510	600	710	820	940	1,070
21	140	190	260	320	390	480	570	670	780	890	1,020
22	140	190	240	310	380	460	540	640	740	850	970
23	130	180	230	290	360	440	520	610	710	810	920
24	130	170	220	280	350	420	500	590	680	780	890
25	120	160	210	270	330	410	480	560	660	750	860
26	110	160	210	260	320	390	460	540	630	720	820
27	110	150	200	250	310	370	440	520	610	690	790
28	110	140	190	240	300	360	430	500	580	670	760
29	110	140	180	230	290	350	410	490	560	640	740

To obtain the safe load for any thickness multiply values for 1 inch by thickness of beam.
To obtain the required thickness for any load divide by safe load for 1 inch.

Handy Reference Data

Number of Pieces of Lumber Required for a Full Thousand Feet

Length in Feet	2x4 Pieces and Exact Amount	2x6 Pieces and Exact Amount	2x8 Pieces and Exact Amount	2x10 Pieces and Exact Amount	2x12 Pieces and Exact Amount
12	125 1000	84 1008	63 1008	50 1000	42 1008
14	108 1008	72 1008	54 1008	43 1003⅓	36 1008
16	94 1002⅔	63 1008	47 1002⅔	38 1013⅓	32 1024
18	84 1008	56 1008	42 1008	34 1020	28 1008
20	75 1000	50 1000	38 1013⅓	30 1000	25 1000
22	69 1012	46 1012	35 1026⅔	28 1026⅔	23 1012
24	63 1008	42 1008	32 1024	25 1000	21 1008

Wt. of Fresh Fallen Snow

5 to 12 pounds per cubic foot.

Costs of Oak Flooring Per Square Foot of Floor Area

B. M. Price Per M Sq. Ft.	Cents Per Square Foot			
	⅜x1½	⅜x2	13/16x1½	13/16x2¼
$ 25	3⅓c	3⅛c	3¾c	3⅓c
30	4 c	3¾c	4½c	4 c
35	4⅔c	4⅜c	5¼c	4⅔c
40	5⅓c	5 c	6 c	5⅓c
45	6 c	5⅝c	6¾c	6 c
50	6⅔c	6¼c	7½c	6⅔c
55	7⅓c	6⅞c	8¼c	7⅓c
60	8 c	7½c	9 c	8 c
65	8⅔c	8⅛c	9¾c	8⅔c
70	9⅓c	8¾c	10½c	9⅓c
75	10 c	9⅜c	11¼c	10 c
80	10⅔c	10 c	12 c	10⅔c
85	11⅓c	10⅝c	12¾c	11⅓c
90	12 c	11¼c	13½c	12 c
95	12⅔c	11⅞c	14¼c	12⅔c
100	13⅓c	12½c	15 c	13⅓c
105	14 c	13⅛c	15¾c	14 c
110	14⅔c	13¾c	16½c	14⅔c
115	15⅓c	14⅜c	17¼c	15⅓c
120	16 c	15 c	18 c	16 c
125	16⅔c	15⅝c	18¾c	16⅔c
130	17⅓c	16¼c	19½c	17⅓c
135	18 c	16⅞c	20¼c	18 c
140	18⅔c	17½c	21 c	18⅔c
145	19⅓c	18⅛c	21¾c	19⅓c
150	20 c	18¾c	22½c	20 c
155	20⅔c	19⅜c	23¼c	20⅔c
160	21⅓c	20 c	24 c	21⅓c
165	22 c	20⅝c	24¾c	22 c
170	22⅔c	21¼c	25½c	22⅔c
175	23⅓c	21⅞c	26¼c	23⅓c
180	24 c	22½c	27 c	24 c
185	24⅔c	23⅛c	27¾c	24⅔c
190	25⅓c	23¾c	28½c	25⅓c
195	26 c	24⅜c	29¼c	26 c
200	26⅔c	25 c	30 c	26⅔c
205	27⅓c	25⅝c	30¾c	27⅓c
210	28 c	26¼c	31½c	28 c
215	28⅔c	26⅞c	32¼c	28⅔c
220	29⅓c	27½c	33 c	29⅓c
225	30 c	28⅛c	33¾c	30 c
230	30⅔c	28¾c	34½c	30⅔c
235	31⅓c	29⅜c	35¼c	31⅓c
240	32 c	30 c	36 c	32 c
245	32⅔c	30⅝c	36¾c	32⅔c
250	33⅓c	31¼c	37½c	33⅓c
255	34 c	31⅞c	38¼c	34 c
260	34⅔c	32½c	39 c	34⅔c
265	35⅓c	33⅛c	39¾c	35⅓c
270	36 c	33¾c	40½c	36 c
275	36⅔c	34⅜c	41¼c	36⅔c
280	37⅓c	35 c	42 c	37⅓c
285	38 c	35⅝c	42¾c	38 c
290	38⅔c	36¼c	43½c	38⅔c
295	39⅓c	36⅞c	44¼c	39⅓c
300	40 c	37½c	45 c	40 c
305	40⅔c	38⅛c	45¾c	44⅔c
310	41⅓c	38¾c	46½c	41⅓c
315	42 c	39⅜c	47¼c	42 c
320	42⅔c	40 c	48 c	42⅔c

Note: Allowance should be made for any irregularities in shape of rooms, also for floor-layer's cutting waste.

Amount of New Air to Be Supplied Per Person

	Cubic Feet Per Minute — Without Humidification or Recirculation	With Humidification but Without Recirculation	With Humidification and Recirculation	Number of Air Changes per Hour
Schools—				
Class Rooms	30	20	5 to 10	....
Assembly Rooms	15 to 20	10 to 15	5 to 10	....
Gymnasiums	30	25	15 to 20	....
Toilets	....	....	....	10 to 20
Locker Rooms	....	....	....	5 to 10
Kitchens	....	....	....	20 to 60
Lunch Rooms	....	....	....	10 to 20
Theaters—				
Seating Space	30 to 50	20 to 30	10 to 15	....
Hospitals—				
Wards	30 to 40	20 to 30	....	....
Kitchens	....	....	....	20 to 60
Dining Rooms	....	....	....	10 to 20
Toilets	....	....	....	10 to 20
Hotels—				
Dining Rooms	....	....	....	10 to 15
Kitchens	....	....	....	20 to 60
Ball Rooms	....	....	....	5 to 10
Work Space	....	....	....	5 to 10
Assembly Rooms	20 to 30	15 to 20	10 to 15	....

NUMBER OF SQUARE FEET IN ONE CORRUGATED SHEET (Standard Length)

Feet	2½ and 5/8 In. Corrugated 26 In. Wide	1¼ In. Corrugated 3 V Crimp 25½ In. Wide	V Crimp 3 V Crimp and Pressed Standing Seam 24 In. Wide
5	10.833	10.625	10.
6	13.	12.75	12.
7	15.167	14.875	14.
8	17.333	17.	16.
9	19.5	19.125	18.
10	21.667	21.25	20.
11	23.833	23.375	22.
12	26.	25.5	24.

Number of Slates and Nails for 100 Square Feet of Roof

Size Inches	Exposure when Laid	Number to 100 Sq. Ft.	Weight of Galvanized Nails	Spacing of Lath
14 x 24	10½	98	1⅜	10½
12 x 24	10½	114	1⅝	10½
12 x 22	9½	126	1¾	9½
11 x 22	9½	138	4d–2	9½
12 x 20	8½	141	2	8½
10 x 20	8½	170	2⅜	8½
12 x 18	7½	160	1⅞	7½
10 x 18	7½	192	2¼	7½
9 x 18	7½	213	2½	7½
12 x 16	6½	185	2⅛	6½
10 x 16	6½	222	2½	6½
9 x 16	6½	246	3	6½
8 x 16	6½	277	3d–3⅛	6½
10 x 14	5½	261	3	5½
8 x 14	5½	327	3¾	5½
7 x 14	5½	374	4¼	5½
8 x 12	4½	400	4⅝	4½
7 x 12	4½	457	5¼	4½
6 x 12	4½	533	6	4½
8 x 10	3½	514	5⅞	3½
7 x 10	3½	588	6¾	3½
6 x 10	3½	686	7⅞	3½

To determine the number of pieces to a square of any size slate not given, first deduct three inches from the length; divide this by two; multiply by the width of the slate; and divide the result into 14,400.

Window Glass—Sizes, Weights and Thickness

GRADES

"AA," first quality; "A," second quality; "B," third quality.

SIZES OBTAINABLE (U. S. Government Specifications)

The maximum dimensions recommended are:

	Width in inches	Length in inches
For single strength	40	50
For double strength	60	80
For heavy sheet	66	90

THICKNESS AND WEIGHTS

	Thickness in inches. Min.	Thickness in inches. Max.	Number of lights per inch, (thickness) Min.	Number of lights per inch, (thickness) Max.	Average weight in ounces per sq. ft.
Single strength	.080	.100	10.5	12.0	18.5
Double strength	.111	.125	8.0	9.0	24.5
26-oz. glass	.125	.135	7.5	8.0	26.0
29-oz. glass	.135	.148	6.5	7.0	29.0
34-oz. heavy glass	.150	.175	6.0	6.5	34.0
39-oz. heavy glass	176	.205	5.0	5.5	39.0

PLATE GLASS

The sizes of stock plate glass vary from 6 inches by 6 inches, by even inches, to 144 inches by 200 inches or 138 inches by 208 inches.

MIRRORS

This glass can be obtained in sizes varying from 4 x 4 inches, by even inches, to 84 inches by 150 inches and with bevels varying from 1 to 2 inches.

Table of Treads and Risers

No. of Treads.	6		6½		6½		6¾		7		7⅛		7¼		7⅜		7½		7⅝		7¾		7⅞		8		8⅛		8½		9		9½		10		10½		11		13		14	
	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.	Inch ft.	Rise. in.
1		6		6⅛		6⅛		6⅜		7		7⅛		7⅛		7⅜		7½		7⅝		7⅞		7⅞		8		8⅛		8½		9		9½		10		10½		11		1 1		1 2	
2	1	0	1	0½	1	1	1	1½	1	2	1	2¼	1	2½	1	2⅝	1	3	1	3⅛	1	3½	1	3¾	1	4	1	4½	1	5	1	6	1	7	1	8	1	9	1	10	2	2	2	4
3	1	6	1	6¾	1	7½	1	8¼	1	9	1	9⅜	1	9¾	1	10⅛	1	10½	1	10⅞	1	11¼	1	11⅝	2	0	2	0⅜	2	1½	2	3	2	4½	2	6	2	7½	2	9	3	3	3	6
4	2	0	2	1	2	2	2	3	2	4	2	4½	2	5	2	5½	2	6	2	6½	2	7	2	7½	2	8	2	9	2	10	3	0	3	2	3	4	3	6	3	8	4	4	4	8
5	2	6	2	7½	2	8½	2	9¾	2	11	2	11⅝	3	0¼	3	0⅞	3	1½	3	2⅛	3	2¾	3	3⅜	3	4	3	5⅛	3	6½	3	9	3	11½	4	2	4	4½	4	7	5	5	5	10
6	3	0	3	1½	3	3	3	4½	3	6	3	6¾	3	7½	3	8¼	3	9	3	9¾	3	10½	3	11¼	4	0	4	1½	4	3	4	6	4	9	5	0	5	3	5	6	6	6	7	0
7	3	6	3	7¾	3	9½	3	11¼	4	1	4	1⅞	4	2¾	4	3⅝	4	4½	4	5⅜	4	6¼	4	7⅛	4	8	4	9⅜	4	11½	5	3	5	6½	5	10	6	1½	6	5	7	7	8	2
8	4	0	4	2	4	4	4	6	4	8	4	9	4	10	4	11	5	0	5	1	5	2	5	3	5	4	5	6	5	8	6	0	6	4	6	8	7	0	7	4	8	8	9	4
9	4	6	4	8½	4	10½	5	0¾	5	3	5	4⅛	5	5¼	5	6⅜	5	7½	5	8⅜	5	9¾	5	10⅞	6	0	6	2¼	6	4½	6	9	7	1½	7	6	7	10½	8	3	9	9	10	6
10	5	0	5	2½	5	5	5	7½	5	10	5	11¼	6	0½	6	1¾	6	3	6	4¼	6	5½	6	6¾	6	8	6	10½	7	1	7	6	7	11	8	4	8	9	9	2	10	10	11	8
11	5	6	5	8¾	5	11½	6	2¼	6	5	6	6⅜	6	7¾	6	9⅛	6	10½	6	11⅞	7	1¼	7	2⅝	7	4	7	6¾	7	9½	8	3	8	8½	9	2	9	7½	10	1	11	11	12	10
12	6	0	6	3	6	6	6	9	7	0	7	1½	7	3	7	4½	7	6	7	7½	7	9	7	10½	8	0	8	3	8	6	9	0	9	6	10	0	10	6	11	0	13	0	14	0
13	6	6	6	9¼	7	0½	7	3¾	7	7	7	8⅝	7	10¼	7	11⅞	8	1½	8	3⅛	8	4¾	8	6⅜	8	8	8	11¼	9	2½	9	9	10	3½	10	10	11	4½	11	11	14	1	15	2
14	7	0	7	3½	7	7	7	10½	8	2	8	3¾	8	5½	8	7⅛	8	9	8	10¾	9	0½	9	2¼	9	4	9	7½	9	11	10	6	11	1	11	8	12	3	12	10	15	2	16	4
15	7	6	7	9¾	8	1½	8	5¼	8	9	8	10⅞	9	0¾	9	2⅝	9	4½	9	6⅜	9	8¼	9	10⅛	10	0	10	3¾	10	7½	11	3	11	10½	12	6	13	1½	13	9	16	3	17	6
16	8	0	8	4	8	8	9	0	9	4	9	6	9	8	9	10	10	0	10	2	10	4	10	6	10	8	11	0	11	4	12	0	12	8	13	4	14	0	14	8	17	4	18	8
17	8	6	8	10½	9	2½	9	6¾	9	11	10	1⅛	10	3½	10	5⅜	10	7½	10	9⅝	10	11¾	11	1⅞	11	4	11	8½	12	0½	12	9	13	5½	14	2	14	10½	15	7	18	5	19	10
18	9	0	9	4½	9	9	10	1½	10	6	10	8¼	10	10½	11	0¾	11	3	11	5¼	11	7½	11	9¾	12	0	12	4½	12	9	13	6	14	3	15	0	15	9	16	6	19	6	21	0
19	9	6	9	10¾	10	3½	10	8¼	11	1	11	3⅝	11	5¾	11	8⅛	11	10½	12	0⅞	12	3½	12	5⅝	12	8	13	0⅜	13	5½	14	3	15	0½	15	10	16	7½	17	5	20	7	22	2
20	10	0	10	5	10	10	11	3	11	8	11	10½	12	1	12	3½	12	6	12	8½	12	11	13	1½	13	4	13	9	14	2	15	0	15	10	16	8	17	6	18	4	21	8	23	4
21	10	6	10	11¾	11	4½	11	9¾	12	3	12	5⅝	12	8¼	12	10⅞	13	1½	13	4⅛	13	6¾	13	9⅛	14	0	14	5¼	14	10½	15	9	16	7½	17	6	18	4½	19	3	22	9	24	6
22	11	0	11	5½	11	11	12	4½	12	10	13	0¾	13	3½	13	6¼	13	9	13	11⅞	14	2½	14	5¼	14	8	15	1½	15	7	16	6	17	5	18	4	19	3	20	2	23	10	25	8
23	11	6	11	11¾	12	5½	12	11¼	13	5	13	7⅜	13	10¾	14	1⅝	14	4½	14	7⅜	14	10¼	15	1⅜	15	4	15	9⅝	16	3½	17	3	18	2½	19	2	20	1½	21	1	24	11	26	10
24	12	0	12	6	13	0	13	6	14	0	14	3	14	6	14	9	15	0	15	3	15	6	15	9	16	0	16	6	17	0	18	0	19	0	20	0	21	0	22	0	26	0	28	0
25	12	6	13	0¼	13	6¼	14	0¾	14	7	14	10⅝	15	1¼	15	4⅜	15	7½	15	10⅝	16	1¾	16	4⅞	16	8	17	2¼	17	8½	18	9	19	9½	20	10	21	10½	22	11	27	1	29	2
26	13	0	13	6½	14	1	14	7½	15	2	15	5⅛	15	8½	15	11¾	16	3	16	6¼	16	9½	17	0¾	17	4	17	10½	18	5	19	6	20	7	21	8	22	9	23	10	28	2	30	4
27	13	6	14	0¾	14	7½	15	2¾	15	9	16	0⅜	16	3¾	16	7⅛	16	10½	17	1⅞	17	5¼	17	8⅝	18	0	18	6¾	19	1½	20	3	21	4½	22	6	23	7½	24	9	29	3	31	6
28	14	0	14	7	15	2	15	9	16	4	16	7½	16	11	17	2½	17	6	17	9½	18	1	18	4½	18	8	19	3	19	10	21	0	22	2	23	4	24	6	25	8	30	4	32	8
29	14	6	15	1¼	15	8½	16	3¾	16	11	17	2⅝	17	6¼	17	9⅞	18	1½	18	5⅛	18	8¾	19	0⅜	19	4	19	11¼	20	6½	21	9	22	11½	24	2	25	4½	26	7	31	5	33	10
30	15	0	15	7½	16	3	16	10½	17	6	17	9¾	18	1½	18	5¼	18	9	19	0¾	19	4½	19	8¼	20	0	20	7½	21	3	22	6	23	9	25	0	26	3	27	6	32	6	35	0

Rule for Calculating Proportioned Width and Height of Treads and Risers of Stairs

Subtract the width of tread from 25 inches and the result will be twice the height of the riser. Thus: if the tread is 10 inches wide, then 25 — 10 = 15 ÷ 2 = 7½ inches.

Furniture Dimensions

Quarter Grand Piano	4'9"x5'3"
Upright Piano	5'3"x2'6"
Davenport	7'x3'
Overstuffed Chair	3'x3'
Rocking Chair	2'x2'6"
Gate Leg Table	3'9" diam.
Console Table	3'x1'6"
Double Bed	4'9"x6'10"
Twin Bed (1)	3'2"x6'10"
Bureau	4'x2'
Chiffonier	3'6"x2'
Day Bed	7'x2'3"
Dressing Table	4'x1'9"
Dressing Bench	2'x1'2"
Chaise Longue	2'6"x4'10"
Circular D. R. Table (large size)	5' diam.
Oblong D. R. Table	5'3"x3'9"
Serving Table	3'3"x1'6"
Buffet	5'4"x1'9"

Painted and Galvanized Roofing

NUMBER OF SQUARE FEET IN ONE CORRUGATED SHEET
(100 square feet—no allowance for laps)

Multiply the number of squares by the number set opposite length of sheet desired in the column for the material wanted. The result is the number of sheets required.

Feet	2½ and 5⅝ in. Corrugated 26 In. Wide	1¼ In. Corrugated 3 V Crimp 25½ In. Wide	V Crimp 3 V Crimp and Pressed Standing Seam 24 In. Wide
5	9.231	9.412	10.
6	7.692	7.843	8.333
7	6.593	6.723	7.143
8	5.769	5.882	6.25
9	5.128	5.229	5.556
10	4.615	4.706	5.
11	4.197	4.278	4.545
12	3.846	3.922	4.167

For Pressed Brick, Rock Face Brick and Stone Siding Sheets 28¼x60 inches, multiply number of squares by 8.5.

Weight of Brass Pipe

Size of Pipe Inches	Weight Per Linear Foot Pounds	Size of Pipe Inches	Weight per Linear Foot Pounds
⅛	0.25	2	4.0
¼	0.43	2½	5.75
⅜	0.62	3	8.30
½	0.9	3½	10.9
¾	1.25	4	12.7
1	1.7	4½	13.9
1¼	2.5	5	15.75
1½	3.0	6	20.6

To Find Weights of Bars and Plates

Iron. Multiply contents in cubic inches by .27777. Result will be weight in pounds.
Steel. Multiply contents in cubic inches by .28332. Result will be weight in pounds.
Copper. Multiply contents in cubic inches by .32118. Result will be weight in pounds.
Brass. Multiply contents in cubic inches by .3112. Result will be weight in pounds.
Lead. Multiply contents in cubic inches by .41015. Result will be weight in pounds.
Zinc. Multiply contents in cubic inches by .25318. Result will be weight in pounds.
Tin. Multiply contents in cubic inches by .26562. Result will be weight in pounds.
Aluminum. Multiply contents in cubic inches by .09375. Result will be weight in pounds.
Bar Steel. Find area of one end, add a cipher and divide by 3 to get weight in pounds per lineal foot.

Capacity of Storage Tanks (For Domestic Use)

As a basis for figuring the size of storage tank required, take the **average amount of water used daily by one person**, which is as follows:

	Gallons per Person Daily
Washing dishes	1
House cleaning	2
Washing clothes	3
Toilet purposes and bathing	9
Drinking	¼
In food	¼
Water closet	9½

Total average of 25 gallons per person per day.

Dimension and Capacities of Round Wrought Steel Tanks

Length or Height in Feet	Diameter Inches	Capacity Gallons	Average Weight Pounds
5	24	120	300
6	24	145	330
7	24	170	360
8	24	200	420
5	30	185	450
6	30	220	500
7	30	257	550
8	30	300	600
10	30	375	700
6	36	325	700
7	36	375	800
8	36	425	900
10	36	530	1,000
8	42	600	1,250
10	42	725	1,500
12	42	850	1,750

Handy Reference Data

Number of Gallons in Round Cisterns and Tanks

Depth in Feet	Diameter in Feet							
	5	6	7	8	9	10	11	12
5	735	1,060	1,440	1,875	2,380	2,925	3,550	4,237
6	881	1,270	1,728	2,250	2,855	3,510	4,260	5,084
7	1,028	1,480	2,016	2,625	3,330	4,095	4,970	5,931
8	1,175	1,690	2,304	3,000	3,805	4,680	5,680	6,778
9	1,322	1,900	2,592	3,375	4,280	5,265	6,390	7,625
10	1,469	2,110	2,880	3,750	4,755	5,850	7,100	8,472
11	1,616	2,320	3,168	4,125	5,250	6,435	7,810	9,319
12	1,762	2,530	3,456	4,500	5,705	7,020	8,520	10,166
13	1,909	2,740	3,744	4,875	6,180	7,605	9,230	11,013
14	2,056	2,950	4,032	5,250	6,655	8,190	9,940	11,860
15	2,203	3,160	4,320	5,625	7,130	8,775	10,650	12,707
16	2,356	3,370	4,608	6,000	7,605	9,360	11,360	13,554
17	2,497	3,580	4,896	6,375	8,080	9,945	12,070	14,401
18	2,644	3,790	5,184	6,750	8,535	10,530	12,780	15,248
19	2,791	4,000	5,472	7,125	9,010	11,115	13,490	16,095
20	2,938	4,210	5,760	7,500	9,490	11,700	14,200	16,942

Depth in Feet	Diameter in Feet							
	13	14	15	16	18	20	22	24
5	4,960	5,765	6,698	7,520	9,516	11,750	14,215	16,918
6	5,952	6,918	8,038	9,024	11,419	14,100	17,059	20,302
7	6,944	8,071	9,378	10,528	13,322	16,450	19,902	23,686
8	7,936	9,224	10,718	12,032	15,225	18,800	22,745	27,070
9	8,928	10,377	12,058	13,536	17,128	21,150	25,588	30,454
10	9,920	11,530	13,398	15,040	19,031	23,500	28,431	33,838
11	10,913	12,683	14,738	16,544	20,934	25,850	31,274	37,222
12	11,904	13,836	16,078	18,048	22,837	28,200	34,117	40,606
13	12,896	14,989	17,418	19,552	24,740	30,550	36,960	43,990
14	13,888	16,142	18,758	21,056	26,643	32,900	39,803	47,374
15	14,880	17,295	20,098	22,260	28,546	35,250	42,646	50,758
16	15,872	18,448	21,438	26,064	30,449	37,600	45,489	54,142
17	16,864	19,601	22,778	25,568	32,352	39,950	48,332	57,520
18	17,856	20,754	24,118	27,072	34,255	42,300	51,175	60,910
19	18,848	21,907	25,458	28,576	36,158	44,650	54,018	64,294
20	19,840	23,060	26,798	30,080	38,062	47,000	56,861	67,678

To find the number of gallons in a tank of unequal diameter multiply the inside bottom diameter in inches by the inside top diameter in inches, then this product by 34; point off four figures and the result will be the average number of gallons to one inch in depth of the tank.

Weights and Measures of Concrete Materials

Sand weighs from 80 to 100 pounds per cubic foot, dry and loose, and from 90 to 115 pounds dry and well shaken.
Gravel weighs from 100 to 120 pounds per cubic foot loose, and about 20 pounds more when well rammed.

Crushed limestone weighs about 90 pounds per cubic foot, varying somewhat either way with the size and the proportion of fine dust.

Copper slag, which has been used successfully where weight is wanted in concrete, weighs 120 to 125 pounds per cubic foot.

Quicklime weighs 64 pounds per cubic foot.

Portland cement, loose, weighs 70 to 90 pounds per cubic foot; packed, about 110 pounds per cubic foot.

Approximate Quantity of Mixing Water Required for Concrete

Mix		Approximate Mix as Usually Expressed			Water Required (Gallons per sack of Cement)	
Cement	Volume of Aggregate After Mixing	Cement	Aggregate		Minimum	Maximum
			Fine	Coarse		
1	3	1	1¼	2½	5	5½
1	4	1	1½	3	5½	6
1	4½	1	2	3	5¾	6¼
1	5	1	2	4	6	6½
1	6½	1	2½	5	7¼	7¾
1	7¾	1	3	6	8¼	8¾

How to Make Watertight Concrete

Concrete made from properly selected aggregates, combined with portland cement in suitable proportions, when thoroughly mixed to the right consistency carefully placed and adequately protected during early hardening, will be watertight under all ordinary conditions.

Watertight concrete means good concrete. A few fundamental principles of good construction should be carefully observed. These can be summarized as follows:

1. All portions of the structure should be strong enough to resist the head of water, either internal or external, to which the concrete may be subjected.

2. Use clean, well graded aggregates.

3. Use a relatively rich mixture, a 1 :2 :3, or better 1 :1½ :3.

4. Use the minimum amount of mixing water that will give a workable, plastic consistency; not over 6 gallons per sack of cement.

5. Mix the concrete thoroughly, at least 1½ minutes per batch mixer.

6. Place the concrete carefully in layers 6 to 12 inches deep, spading or rodding it thoroughly to prevent the formation of stone pockets or voids.

7. If possible place the concrete in one continuous operation to avoid construction joints. If placing is interrupted, be sure to get a good bond between the fresh concrete and that placed previously.

8. Keep the concrete warm and damp for the first ten days.

In tests conducted by the U. S. Bureau of Standards, thin slabs of a lean (1:6) portland cement mortar and 1:1½:2 concrete were subjected to a water pressure of 60 pounds per square inch. This pressure is equivalent to a 138-foot head of water. Although water penetrated through 1⅝-inch limestone slabs in periods ranging from 20 seconds to 20 minutes, it took 3½ hours for water to penetrate through a 2-inch slab of 1:6 mortar, while at the end of 24 hours, when the test was terminated, the 2-inch slab of 1:1½:2 concrete was still dry.

Hundreds of concrete tanks are being used for the storage of fuel oil, which is lighter than water, and these tanks are oil-tight, and of course watertight. Concrete basements, pits, bridges, and tanks will also be watertight if proper care is taken in their construction. Experience and tests have shown that proper practice will make watertight concrete.

Number of U. S. Gallons in Rectangular Tanks

For One Foot in Depth.

Width in Feet	Length of Tank in Feet										
	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7
2	29.92	37.40	44.88	52.36	59.84	67.32	74.81	82.29	89.77	97.25	104.73
2.5		46.75	56.10	65.45	74.80	84.16	93.51	102.86	112.21	121.56	130.91
3			67.32	78.54	89.77	100.99	112.21	123.43	134.65	145.87	157.09
3.5				91.64	104.73	117.82	130.91	144.00	157.09	170.18	183.27
4					119.69	134.65	149.61	164.57	179.53	194.49	209.45
4.5						151.48	168.31	185.14	201.97	218.80	235.63
5							187.01	205.71	224.41	243.11	261.82
5.5								226.28	246.86	267.43	288.00
6									269.30	291.74	314.18
6.5										316.05	340.36
7											366.54

Width in Feet	Length of Tank in Feet									
	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12
2	112.21	119.69	127.17	134.65	142.13	149.61	157.09	164.57	172.05	179.53
2.5	140.26	149.61	158.96	168.31	177.66	187.01	196.36	205.71	215.07	224.41
3	168.31	179.53	190.75	202.97	213.19	224.41	235.63	246.86	258.07	269.30
3.5	196.36	209.45	222.54	235.63	248.73	261.82	274.90	288.00	301.09	314.18
4	224.41	239.37	254.34	269.30	284.26	299.22	314.18	329.14	344.10	359.06
4.5	252.47	269.30	286.13	302.96	319.79	336.62	353.45	370.28	387.11	403.94
5	280.52	299.22	317.92	336.62	355.32	374.03	392.72	411.43	430.13	448.83
5.5	308.57	329.14	349.71	370.28	390.85	411.43	432.00	452.57	473.14	493.71
6	336.62	359.06	381.50	403.94	426.39	448.83	471.27	493.71	516.15	538.59
6.5	364.67	388.98	413.30	437.60	461.92	486.23	510.54	534.85	559.16	583.47
7	392.72	418.91	445.09	471.27	497.45	523.64	549.81	575.99	602.18	628.36
7.5	420.78	448.83	476.88	504.93	532.98	561.04	589.08	617.14	645.19	673.24
8		478.75	508.67	438.59	568.51	598.44	628.36	658.28	688.20	718.12
8.5			540.46	572.25	604.05	635.84	667.63	699.42	731.21	763.00
9				605.92	639.58	673.25	706.90	740.56	774.23	807.89
9.5					675.11	710.65	746.17	781.71	817.24	852.77
10						748.05	785.45	822.86	860.26	897.66
10.5							824.73	864.00	903.26	942.56
11								905.14	946.27	987.43
11.5									989.29	1032.30
12										1077.20

Example—To find number of gallons in a rectangular tank that is 7.5 feet by 10 feet, the water being 4 feet deep: Look in extreme left-hand column for 7.5, and opposite to this in column headed 10 read 561.04, which being multiplied by 4, the depth of water in the tank, gives 2244.2, the number of gallons required.

Number of Common Brick (8″ x 2¼″ x 3¾″) Required for One Square Foot of Brick Wall of Any Thickness

Thickness of wall in inches	Number of bricks thick	Thickness of Mortar Joints in inches: ⅛ in.	¼ in.	⅜ in.	½ in.	⅝ in.	¾ in.
4 or 4½	1	7½	7	6½	6⅙	5⅞	5½
8 or 9	2	15	14	13	12⅓	11¾	11
12 or 13	3	22½	21	19½	18½	17⅝	16½
16 or 17	4	30	28	26	24⅔	23½	22
20 or 21	5	37½	35	32½	30⅚	29⅜	27½
24 or 25	6	45	42	39	37	35¼	33

Quantity of Mortar Required to Lay 1,000 Common Bricks

Thickness of Mortar Joints in Inches: ⅛ in.	¼ in.	⅜ in.	½ in.	⅝ in.	¾ in.
4½ cu. ft.	9 cu. ft.	13½ cu. ft.	18 cu. ft.	22½ cu. ft.	27 cu. ft.

Brick Required and Weights of Ideal Hollow Brick Walls

Type of wall—	Number of brick per sq. ft. of wall	Average weight per sq. ft. of wall, pounds
8″ All-Rolok	9.03	50.36
12½″ All-Rolok, Type 1	13.28	74.02
12½″ All-Rolok, Type 2	14.30	80.22
8″ Rolok-Bak, Headers, 3rd Course	10.78	62.45
8″ Rolok-Bak, Headers, 6th Course	10.52	60.85
12½″ Rolok-Bak	15.44	87.63

Materials Required for One Cubic Yard of Brick Mortar Showing Both Lime and Portland Cement Mixture

Mix by Volume: Lime Pct.	Cement Pct.	Sand Ratio	Lime Lbs.	Lime	Cement Lbs.	Sand Cu. Yds.
100	0	1:4	182 Q	1 Bbl.	0	1.00
		1:4	297 H	6 Sacks	0	1.00
100	0	1:3	243 Q	1.35 Bbls.	0	1.00
		1:3	396 H	8 Sacks	0	1.00
100	0	1:2½	292 Q	1.62 Bbls.	0	1.00
		1:2½	475 H	9.5 Sacks	0	1.00
100	0	1:2	322 Q	1.8 Bbls.	0	1.00
		1:2	528 H	10.5 Sacks	0	1.00
90	10	1:3	219 Q	1.22 Bbls.	98	1.00
		1:3	356 H	7.12 Sacks	98	1.00
80	20	1:3	194 Q	1.08 Bbls.	196	1.00
		1:3	317 H	6.34 Sacks	196	1.00
70	30	1:3	170 Q	0.95 Bbls.	294	1.00
		1:3	277 H	5.5 Sacks	294	1.00
60	40	1:3	146 Q	0.81 Bbls.	392	1.00
		1:3	238 H	4.76 Sacks	392	1.00
50	50	1:3	122 Q	0.68 Bbls.	490	1.00
		1:3	198 H	4 Sacks	490	1.00
40	60	1:3	97 Q	0.54 Bbls.	588	1.00
		1:3	158 H	3.16 Sacks	588	1.00
30	70	1:3	73 Q	0.41 Bbls.	697	1.00
		1:3	119 H	2.38 Sacks	697	1.00
20	80	1:3	49 Q	0.27 Bbls.	784	1.00
		1:3	80 H	1.6 Sacks	784	1.00
10	90	1:3	24 Q	0.13 Bbls.	882	1.00
		1:3	40 H	0.8 Sacks	882	1.00
0	100	1:3	0		981	1.00
10	100	1:3+1/10	24 Q	0.13 Bbls.	981	1.00
10	100	1:3+1/10	44 H	0.88 Sacks	981	1.00

Q Represents Quicklime.
H Represents Hydrated Lime.

Amount of Mortar Required for a Cubic Yard of Masonry

Kind of Masonry	Mortar, Cu. Yd. Minimum	Maximum
Ashlar, 12-in. courses, ¼-in. joints	0.06	0.08
Ashlar, 18-in. courses, ¼-in. joints	0.03	0.04
Ashlar, 12 to 20-in. courses, ⅜ to ½-in. joints	0.07	0.08
Ashlar, 20 to 32-in. courses, ¼ to ⅜-in. joints	0.05	0.06
Brickwork (bricks of standard size, 8x2¼x3¾ in.)		
⅛-in. joints	0.10	0.15
¼-in. to ⅜-in. joints	0.25	0.35
½-in. to ⅝-in. joints	0.35	0.40
Concrete blocks or tile	0.50	0.55
Rubble, course, not dressed	0.33	0.40
Rubble, roughly dressed	0.25	0.30
Squared-stone masonry, 12-in. courses and ¾-in. joints	0.20	0.25
Squared-stone masonry, 18-in. courses and ¾-in. joints	0.12	0.15

Thickness of Brick Walls for Buildings

Note: In some cities, building ordinance exceptions will vary these sizes

(Thickness given in inches)

Height of Building	Stories: 1st	2nd	3d	4th
Two Stories:				
Boston	16	12	....	....
New York	12	12	....	....
Chicago	12	12	....	....
Minneapolis	12	12	....	....
St. Louis	18	13	....	....
Denver	13	13	....	....
San Francisco	17	13	....	....
New Orleans	13	13	....	....
Three Stories:				
Boston	20	16	16	....
New York	16	16	12	....
Chicago	16	12	12	....
Minneapolis	16	12	12	....
St. Louis	18	18	13	....
Denver	17	17	13	....
San Francisco	17	17	13	....
New Orleans	13	13	13	....
Four Stories:				
Boston	20	16	16	16
New York	16	16	16	12
Chicago	20	16	16	12
Minneapolis	16	16	12	12
St. Louis	22	18	18	13
Denver	21	17	17	13
San Francisco	17	17	17	13
New Orleans	18	18	13	13

Basement walls of the following thicknesses are required by the Chicago Building Ordinance:

1-Story	2-Story	3-Story	4-Story
12″	16″	16″	20″

Exceptions in the Chicago Building Ordinance allow a thickness of 12 inches for the basement walls of two and three-story dwellings or apartment buildings and also for the first story walls of three-story buildings of these types.

Another exception in the Chicago Building Ordinance allows brick walls 8 inches thick for one-story dwellings and also for the second floor walls of two-story dwellings or apartment houses, provided a pressed brick face is not used. It also allows three-story dwellings or apartment houses to have a 12-inch wall from the basement up.

In school buildings, walls which are less than 50 feet in length between cross walls, may be 4 inches less in thickness than otherwise called for in the ordinance.

Approximate Sizes of Chimney Flues for Steam and Hot Water Heating in Residences and Other Buildings

Direct Radiation*: Steam (Sq. Ft.)	Water (Sq. Ft.)	Size of Flue: Round Diam. In.	Square
250	400	8	8 x 8
300	500	8	8 x 8
400	700	8	8 x 8
500	850	10	8 x 12
600	1,000	10	8 x 12
700	1,200	10	8 x 12
800	1,350	12	12 x 12
900	1,500	12	12 x 12
1,000	1,700	12	12 x 12
1,200	2,100	12	12 x 12
1,400	2,400	14	12 x 16
1,600	2,700	14	12 x 16
1,800	3,000	14	12 x 16
2,000	3,400	14	12 x 16
2,200	3,700	16	16 x 16
3,000	5,100	16	16 x 16
3,500	5,900	18	16 x 20
5,000	8,500	18	16 x 20

*NOTE—When a considerable amount of "indirect" radiation is to be used, increased boiler capacity is necessary; and in many cases such demands require a larger chimney flue for the same number of square feet of radiation used.

Safe Bearing Loads on Masonry

Material	Lbs. per sq. in. of area
Granite—	
Cap Stone	700
Squared Stonework	350
Sandstone—	
Cap Stone	350
Squared Stonework	175
Rubble Stonework, lime mortar	80
Rubble Stonework, cement mortar	150
Limestone—	
Cap Stone	500
Squared Stonework	250
Rubble Stonework, lime mortar	80
Rubble Stonework, cement mortar	150

Handy Reference Data

Soil-Pipe Sizes Required by Various Cities

Municipal regulations ordinarily govern the sizes of soil-pipe that are allowed to be installed in towns and cities of any considerable size. The regulations in some of the leading American cities are indicated in the following:

Baltimore, Md.; Buffalo, N. Y.; Chicago, Ill.; Cincinnati, Ohio; Denver, Colo.; Detroit, Mich.; Minneapolis, Minn.; New Haven, Conn.; Omaha, Neb.; St. Joseph, Mo.; San Francisco, Calif.
Minimum diameter, 4 in.

ALLEGHENY, PA.; PITTSBURGH, PA.; SCRANTON, PA.

For 1 to 4 water-closets, not less than 4 in.
For 4 to 8 water-closets, not less than 6 in.

JERSEY CITY, N. J.

For 1 and less than 10 water-closets, with other fixtures, 4 in.
For 10 and less than 20 water-closets, with other fixtures, 5 in.
For 20 or more water-closets, with other fixtures, 6 in.

MILWAUKEE, WIS.

For 4 water-closets, 4 in.
For 10 water-closets, 5 in.
For 25 water-closets, 6 in.
For over 25 water-closets, 8 in.

NEWARK, N. J.; PATERSON, N. J.

For main soil-pipe, 4 in.
For main soil-pipe for water-closets on 5 or more floors, 5 in.
For main soil-pipe for tenements or factories, 5 in.

NEW ORLEANS, LA.

For 1 to 5 water-closets, 4 in.
For more than 5 water-closets, 5 in.
In buildings over 5 stories, and having more than 8 water-closets, 6 in.

PHILADELPHIA, PA.

For 1 to 6 water-closets, 4 in.
For 7 to 12 water-closets, 5 in.
For 13 to 20 water-closets, 6 in.
If building is 5 up to 12 stories high, 5 in.
If building is more than 12 stories high, 6 in.

CLEVELAND, OHIO; COLUMBUS, OHIO.

The maximum number of fixtures connected to pipe of various sizes is indicated as follows:

Soil-Pipe	Branch —Soil and	Main Waste—	Branch —Soil Pipe	Main Alone—
4-in.	48	96	12	24
5-in.	96	192	24	48
6-in.	168	336	42	84
7-in.	280	560	70	140
8-in.	420	840	105	210
9-in.	580	1,160	145	290
10-in.	800	1,600	200	400
11-in.	1,060	2,120	265	530
12-in.	1,420	2,840	355	710

WASHINGTON, D. C.

For 1 to 12 water-closets, 4 in.
For 13 to 35 water-closets, 5 in.
For 26 to 40 water-closets, 6 in.

TOLEDO, OHIO.

For main soil-pipe from 6 water-closets or bathrooms, 4 in.
For main soil-pipe from 6 to 10 bathrooms or water-closets, 5 in.

ROCHESTER, N. Y.

For 1 to 30 fixtures, 4 in.
For 30 to 50 fixtures, 5 in.
For 51 or more fixtures, 6 in.
One water-closet is counted as 2 fixtures; one tub, or sink, etc., is counted as 1.

ST. PAUL, MINN.

For main soil-pipe, not less than 4 in.
For main soil-pipe for water-closets on 5 or more floors, 5 in.
For main soil-pipe from more than 10 bathrooms, 6 in.
Three-foot urinal trough or wash-sink, or 1 bath, basin, sink, or small fixture, is counted as 1 fixture; and 1 water-closet, pedestal urinal, or slop hopper, is counted as 2 fixtures.
The above shows the sizes used in daily installations in various cities where local rulings govern, and all work is tested and inspected before being covered up by the other trades.

Hot Water Heating—Cu. Ft. of Space Heated by 1 Sq. Ft. of Direct Radiation

	Cu. Ft.
Residence Buildings—	
Living Rooms, one side exposed	25 to 30
Living Rooms, two sides exposed	25 to 27
Living Rooms, three sides exposed	20 to 25
Sleeping Rooms	30 to 35
Halls and Bath Rooms	20 to 30
Vestibule	35 to 40
Public Buildings—	
Offices	30 to 40
Schoolrooms	30 to 40
Factories and Stores	40 to 60
Assembly Halls and Churches	60 to 100

Indirect Hot Water Heating Data

Sq. ft. of heating surface (water)	Area of cold air supply (sq. in.)	Area of hot air flue (sq. in.)	Size of register (inches)
26	36	48	8 x 12
52	54	72	9 x 12
78	72	96	10 x 12
104	90	120	12 x 15
130	108	144	12 x 19
156	126	168	14 x 22
182	144	192	14 x 24
208	162	216	16 x 20
234	180	240	16 x 24
260	198	264	20 x 20
286	216	288	20 x 24
312	234	312	20 x 24

Length of Pipe Giving One Square Foot of Radiating Surface

Size of pipe	Length per sq. ft.	Size of pipe	Length per sq. ft.
1 inch	36 inches	3½ inch	12 inches
1¼ inch	28 inches	4 inch	11 inches
1½ inch	24 inches	4½ inch	10 inches
2 inch	20 inches	5 inch	9 inches
2½ inch	16 inches	6 inch	8 inches
3 inch	13 inches	8 inch	6 inches

Simple Rule for Computing Radiation for Steam and Hot Water Heating

A quick, easily remembered and fairly accurate rule for computing the amount of radiation required for steam heating is the 2-20-200 rule, as follows:

Allow 1 square foot of radiation for each 2 square feet of outside door and glass area; 1 square foot of radiation for each 20 square feet of exposed wall and ceiling area; and 1 square foot of radiation for each 200 cubic feet of air contents. If site is exposed to northern and western gales, add at least 20 per cent to radiation in rooms on the north and west.

For hot water heating, add 60 per cent to the radiation required for steam. For vapor heating, add 20 per cent to the amount required for steam.

Estimating Size of Heating Boiler Required

Add together the radiation required in all rooms and hallways and then add from 25 to 50 per cent for losses from pipes, depending on the size of the job. While 25 per cent will be sufficient on most jobs with 4,000 square feet or over of steam and 6,500 square feet or over of hot water column radiation, for jobs smaller than these 50 per cent must usually be added.

Standard Dimensions of Wrought-Iron Welded Steam, Gas and Water Pipe

Nominal internal, inches	Diameter — Actual external, inches	Diameter — Actual internal, inches	Diameter — Thickness, inches	Circumference — External, inches	Circumference — Internal inches	Internal area, sq. inches	Length of pipe per sq. ft. of external surface, ft.	Square feet of surface per ft. in length	Nominal weight per foot, pounds	Number of threads per inch of screw	Inside diameter, inches
⅛	.405	.27	.068	1.272	.848	.0573	9.44	.106	.24	27	⅛
¼	.54	.364	.088	1.696	1.144	.1041	7.075	.141	.42	18	¼
⅜	.675	.494	.091	2.121	1.552	.1917	5.657	.177	.56	18	⅜
½	.84	.623	.109	2.639	1.957	.3048	4.547	.220	.84	14	½
¾	.105	.824	.113	3.299	2.589	.5333	3.637	.275	1.12	14	¾
1	1.315	1.048	.134	4.131	3.292	.8626	2.904	.344	1.67	11½	1
1¼	1.66	1.38	.14	5.215	4.335	1.496	2.301	.434	2.24	11½	1¼
1½	1.9	1.611	.145	5.969	5.061	2.038	2.01	.497	2.68	11½	1½
2	2.375	2.067	.154	7.461	6.494	3.356	1.608	.621	3.61	11½	2
2½	2.875	2.468	.204	9.032	7.753	4.784	1.328	.753	5.74	8	2½
3	3.5	3.067	.217	10.996	9.636	7.388	1.091	.916	7.54	8	3
3½	4.	3.548	.226	12.566	11.146	9.887	.955	1.047	9.	8	3½
4	4.5	4.026	.237	14.137	12.648	12.73	.849	1.178	10.66	8	4
4½	5.	4.508	.246	15.708	14.162	15.961	.764	1.309	12.49	8	4½
5	5.563	5.045	.259	17.477	15.849	19.99	.687	1.456	14.5	8	5
6	6.625	6.065	.28	20.813	19.054	28.888	.577	1.734	18.76	8	6
7	7.625	7.023	.301	23.955	22.063	38.738	.501	1.996	23.27	8	7
8	8.625	7.982	.322	27.096	25.076	50.04	.443	2.256	28.18	8	8
9	9.625	8.937	.344	30.238	28.076	62.73	.397	2.520	33.7	8	9
10	10.75	10.019	.366	33.772	31.477	78.839	.355	2.814	40.	8	10
11	11.75	11.	.375	36.914	34.558	95.033	.325	3.076	45.	8	11
12	12.75	12.	.375	40.055	37.7	113.098	.299	3.338	49.	8	12

Safe Loads in Pounds Uniformly Distributed for Common Sizes of Standard Steel I-Beams

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam.

Distance Between Supports in Feet	Standard I-Beams 7-Inch 15 Lbs.	8-Inch 18 Lbs.	9-Inch 21 Lbs.	10-Inch 25 Lbs.
4	27,600	.....	.....	.....
5	22,080	30,330	.....	.....
6	18,400	25,280	.....	.....
7	15,770	21,670	.....	.....
8	13,800	18,960	25,160	.....
9	12,270	16,850	22,370	.....
10	11,040	15,170	20,130	26,050
11	10,040	13,790	18,300	23,680
12	9,200	12,640	16,770	21,710
13	8,490	11,670	15,480	20,040
14	7,890	10,830	14,380	18,610
15	*7,360	10,110	13,420	17,360
16	*6,900	*9,480	12,580	16,280
17	*6,490	*8,920	11,840	15,320
18	*6,130	*8,430	11,180	14,470
19	*5,810	*7,980	*10,590	13,710
20	*5,520	*7,580	*10,064	13,020

*While safe at these spans, the deflection in each case will be greater than the allowable limit for plastered ceilings, which is 1/360th of the span.

Safe Loads in Pounds Uniformly Distributed for Common Sizes of Standard Steel I-Beams

Safe loads below are figured for fibre stress of 16,000 pounds per square inch and include weight of beam.

Distance Between Supports in Feet	Standard I-Beams 12-Inch 31.5 Lbs.	15-Inch 42 Lbs.
10	38,370	62,830
11	34,880	57,120
12	31,970	52,360
13	29,510	48,330
14	27,400	44,880
15	25,580	41,880
16	23,980	39,270
17	22,570	36,960
18	21,310	34,900
19	20,190	33,070
20	19,180	31,410
21	18,270	29,920
22	17,440	28,560
23	16,680	27,320
24	15,990	26,180
25	*15,350	25,130

*While safe at these spans, the deflection in each case will be greater than the allowable limit for plastered ceilings, which is 1/360th of the span.

Approximate Weight and Strength of Manila Rope

Manila, Sisal, New Zeland, and Jute Ropes weigh (about) alike. Tarred Hemp Cordage will weigh (about) one-fourth more. Manila is about 25 per cent stronger than Sisal. Working load about one-fourth of breaking strain.

Circumference in Inches	Diameter in Inches	Weight of 1000 Feet in Pounds	Number of Feet and Inches in One Pound		Strength of New Manila Rope in Pounds
			Feet	Inches	
¾	¼	23	50	.....	450
1	5/16	33	33	.....	780
1⅛	⅜	42	25	.....	1000
1¼	7/16	52	19	.....	1280
1½	½	74	11	.....	1760
1¾	9/16	101	9	.....	2400
2	⅝	132	7	.....	3140
2¼	¾	167	6	.....	3970
2½	13/16	207	5	.....	4900
2¾	⅞	250	4	.....	5900
3	1	297	3	6	7000
3¼	1 1/16	349	2	10	8200
3½	1⅛	405	2	4	9600
3¾	1¼	465	2	1	11000
4	1 5/16	529	1	10	12500
4¼	1⅜	597	1	8	14000
4½	1 7/16	669	1	5	15800
4¾	1½	746	1	4	17600
5	1⅝	826	1	2	19500
5½	1¾	1000	1	.....	23700
6	1⅞	1190	.....	10	28000
6¼	2	1291	.....	9½	33000
6½	2⅛	1397	.....	8½	38000
7	2¼	1620	.....	7	44000
7½	2⅜	1860	.....	6½	50000
8	2 5/16	2116	.....	5½	60000
8½	2¾	2388	.....	5	63000
9	2⅞	2673	.....	4½	67700
9½	3	2983	.....	4	70000
10	3 3/16	3306	.....	3⅝	78000

Safe Loads on Stud Partitions

Weight and Strength Based on Actual Size Board Measure.
Add Weight of Plaster or Ceiling.
Single Plate Top and Bottom Included, Same Size as Studs.
Safe Load Based on Studs Being Bridged at Center.

Nominal size	Actual size	Distance on centers, inches	Height, feet	Per Linear Foot of Partition Safe load, pounds	Weight, pounds	Board feet
2 x 4	1⅝ x 3⅝	12	8	3723	16.30	6.66
"	"	"	10	3180	19.56	8.00
"	"	"	12	2631	22.82	9.33
"	"	16	8	2793	13.04	5.33
"	"	"	10	2385	15.50	6.33
"	"	"	12	1974	18.75	7.66
2 x 6	1⅝ x 5⅝	12	8	5767	25.30	10.00
"	"	"	10	4926	30.56	12.00
"	"	"	12	4076	35.42	14.00
"	"	16	8	4326	20.24	8.00
"	"	"	10	3699	24.03	9.50
"	"	"	12	3057	27.83	11.00
2½ x 6	2¼ x 5½	12	8	9079	34.30	12.50
"	"	"	10	8250	41.16	15.00
"	"	"	12	7422	48.02	17.50
"	"	16	8	6808	27.44	10.00
"	"	"	10	6187	32.59	12.00
"	"	"	12	5566	37.73	13.75
3 x 6	2¾ x 5½	12	8	11823	42.00	15.00
"	"	"	10	10992	50.40	18.00
"	"	"	12	10175	59.80	21.00
"	"	16	8	8868	33.60	12.00
"	"	"	10	8244	39.90	14.25
"	"	"	12	7630	46.20	16.50
2 x 8	1⅝ x 7½	12	8	7692	33.80	13.33
"	"	"	10	6570	40.56	16.00
"	"	"	12	5436	47.32	18.66
"	"	"	14	4315	54.08	21.33
"	"	16	8	5769	27.04	10.66
"	"	"	10	4927	32.11	12.66
"	"	"	12	4077	37.18	14.66
"	"	"	14	3236	42.25	16.66
2½ x 8	2¼ x 7½	12	8	12382	46.80	16.66
"	"	"	10	11252	56.16	20.00
"	"	"	12	10122	65.52	23.33
"	"	"	14	9008	74.88	26.66
"	"	16	8	9286	37.44	13.33
"	"	"	10	8439	44.46	15.83
"	"	"	12	7591	51.48	18.33
"	"	"	14	6756	58.50	20.83
3 x 8	2¾ x 7½	12	8	16124	57.20	20.00
"	"	"	10	14990	68.64	24.00
"	"	"	12	13877	80.08	28.00
"	"	"	14	12743	91.52	32.00
"	"	16	8	12093	45.76	16.00
"	"	"	10	11242	54.34	19.00
"	"	"	12	10408	62.92	32.00
"	"	"	14	9557	71.50	25.00

Miscellaneous

To Drill Hardened Steel. Cover your steel with melted beeswax; when coated and cold, make a hole in the wax with a fine pointed needle or other article the size of holes you require, put a drop of strong nitric acid upon it; after an hour rinse off and apply again; it will gradually eat through. A mixture of one ounce of sulphate of copper, ¼ ounce of alum, ½ teaspoonful of powdered salt, one gill vinegar and 20 drops of nitric acid will make a hole in steel that is too hard to cut or file easily.

A small hole drilled at the end of a crack in sheet steel will stop it from growing longer.

To Sharpen Reamers. Use a stone on face and top of cutting edge, taking care to keep stone perfectly flat.

To Temper Steel on One Edge Only. Dip the edge to be tempered into hot lead until proper color; then temper in ordinary fashion.

Annealing Steel. For small pieces of steel take a piece of gas pipe two or three inches in diameter and put the pieces in it, first heating one end of the pipe and drawing it together, leaving the other end open to look into. When the pieces are of a cherry red, cover the fire with sawdust; use a charcoal fire, and leave the steel in over night.

In Turning Steel or Other Hard Metal. Use a drop composed of petroleum, two parts, and turpentine, one part. This will insure easy cutting and perfect tools when otherwise the work would stop, owing to the breakage of tools from the severe strain.

To Clean Rusty Steel. Mix ten parts of tin putty, eight parts of prepared Buck's-horn and twenty-five parts of Spirit of Wine to a paste. Cleanse the steel with this preparation; finally rub off with soft blotting paper. Immerse the articles in kerosene oil for some time and the rust will loosen and come off easily.

Ammonia Citrate takes rust and oxides off iron without attacking the iron.

To Clean Zinc. Rub with a piece of cotton cloth dipped in kerosene, afterwards with a dry cloth.

TO COPPER IRON OR ZINC

Brine water, three quarts; Sulphate of Copper, one pound. Mix, immerse the article, and let it remain till the color suits. Then wash and dry in sawdust.

TO LOOSEN A SCREW THAT IS RUSTED IN IRON OR WOOD

Heat a piece of iron and then place it against the head of the screw; the heat will cause the screw to expand and break the rust; let it cool off, and the screw will contract again, and will then be easily removed.

Steel Beams

Bending Moments and Deflections for Beams of Uniform Section

The following formulae are taken from the Handbook of the Cambria Steel Company:

W = Total Load, in pounds, uniformly distributed, including the weight of beam.
W_1 = Total Superimposed or Live Load, in pounds, uniformly distributed.
W_2 = Total Weight of Beam or Dead Load, in pounds, uniformly distributed.
P, P_1,P_2,P_3 = Loads, in pounds, concentrated at any point.
M = Total Bending Moment, in inch-pounds.
M_{w1}, M_p = Bending Moments, in inch-pounds, due to Weights W_1 and P, respectively.
I = Moment of Inertia, in inches^4.
l = Length of Span, in inches.
E = Modulus of Elasticity, in pounds per square inch = 29,000,000 for steel.
W_s = Total Safe Load, in pounds, uniformly distributed, including weight of beam = Total Safe Load of Tables.
The ordinates in diagrams give the bending moments for corresponding points on beam. For superimposed load only, make W_2 in formulae equal to zero.

(1) Beam Supported at both ends and Uniformly Loaded.

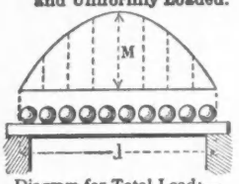


Diagram for Total Load:—
Draw parabola having $M = \frac{Wl}{8}$

Safe Superimposed Load, in lbs., uniformly distributed, $W'_s = W_s - W_2$.

Maximum Bending Moment at middle of beam = $M = \frac{Wl}{8} = \frac{(W_1 + W_2)l}{8}$.

Maximum Shear at points of support = $\frac{W}{2} = \frac{W_1 + W_2}{2}$.

Maximum deflection = $\frac{5}{384}\frac{Wl^3}{EI} = \frac{5}{384}\frac{(W_1 + W_2)l^3}{EI}$.

(2) Beam Supported at both ends with Load Concentrated at the Middle.

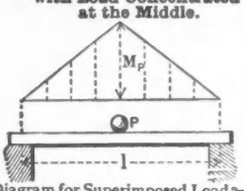


Diagram for Superimposed Load:—
Draw triangle having $M_p = \frac{Pl}{4}$
Diagram, Dead Load, similar to Case (1)

Safe Superimposed Load, in lbs., concentrated, $P_s = \frac{W_s - W_2}{2}$.

Maximum Bending Moment at middle of beam = $M = \frac{Pl}{4} + \frac{W_2 l}{8}$.

Maximum Shear at points of support = $\frac{P + W_2}{2}$.

Max. Deflection = $\frac{Pl^3}{48EI} + \frac{5}{384}\frac{W_2 l^3}{EI}$.

(3) Beam fixed at one end, Unsupported at the other and Uniformly Loaded.

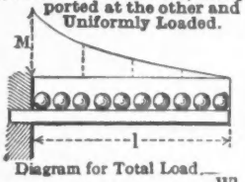


Diagram for Total Load.—
Draw Parabola having $M = \frac{Wl}{2}$

Safe Superimposed Load, in lbs., uniformly distributed, $W'_s = \frac{W_s}{4} - W_2$.

Maximum Bending Moment at point of support = $\frac{Wl}{2} = \frac{(W_1 + W_2)l}{2}$.

Maximum Shear at point of support = $W = W_1 + W_2$.

Max. Deflection = $\frac{Wl^3}{8EI} = \frac{(W_1 + W_2)l^3}{8EI}$.

(4) Beam fixed at one end, and Unsupported at other, with Load Concentrated at the free end.

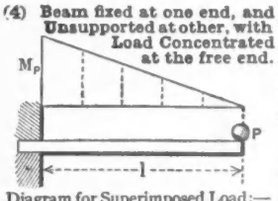


Diagram for Superimposed Load:—
Draw triangle having $M_p = Pl$.
Diagram, Dead Load, similar to Case (3)

Safe Superimposed Load, in lbs., concentrated, $P_s = \frac{W_s - 4W_2}{8}$.

Maximum Bending Moment at point of support = $Pl + \frac{W_2 l}{2}$.

Maximum Shear at point of support = $P + W_2$.

Maximum Deflection = $\frac{Pl^3}{3EI} + \frac{W_2 l^3}{8EI}$.

(5) Beam Supported at both ends with Load Concentrated at any point.

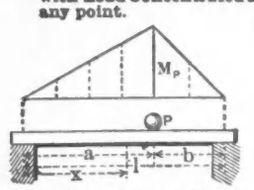


Diagram for Superimposed Load:—
Draw triangle having $M_p = \frac{Pab}{l}$.
Diagram, Dead Load, similar to Case (1)

Safe Superimposed Load, in lbs., concentrated, $P_s = \frac{W_s l^3 - 4a W_2 (l - a)}{8ab}$.

Maximum Bending Moment under load = $\frac{a(2Pb + W_2 l - W_2 a)}{2l}$.

Max. Shear at Sup. near a = $\frac{Pb}{l} + \frac{W_2}{2}$.

Max. Shear at Sup. near b = $\frac{Pa}{l} + \frac{W_2}{2}$.

Deflection at distance x from left support = $\frac{l}{3EIl}\left[\frac{2al - a^2}{3}\right]^{\frac{3}{2}}$
$\left[Pb + \frac{W_2}{8}\left(\sqrt{\frac{2al - a^2}{3}} + \frac{3l^3}{2al - a^2} - 2l\right)\right]$

$x = \sqrt{\frac{2al - a^2}{3}}$ = Distance, from left support, of point of maximum deflection for superimposed load.

(6) Beam Supported at both ends with two Symmetrical Loads.

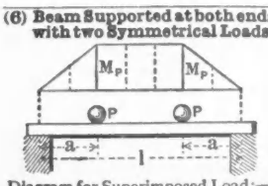


Diagram for Superimposed Load:—
Draw trapezoid having $M_p = Pa$.
Diagram, Dead Load, similar to Case (1)

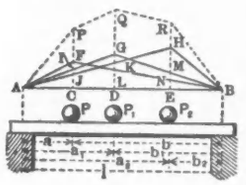
Safe Superimposed Load, in lbs., concentrated, each, $P_s = \frac{W_s l - W_2 l}{8a}$.

Maximum Bending Moment at center of beam = $Pa + \frac{W_2 l}{8}$.

Maximum Shear at points of support = $\frac{2P + W_2}{2}$.

Maximum Deflection = $\frac{Pa}{24EI}\left(3l^2 - 4a^2\right) + \frac{5}{384}\frac{W_2 l^3}{EI}$.

(7) Beam Supported at both ends with Loads Concentrated at various Points.



The total bending moment at any point produced by all the weights is equal to the sum of the moments at that point produced by each of the weights separately.

Diagram for Dead Load similar to Case (1).

The Maximum Bending Moment occurs at the point where the vertical shear equals zero and will be at one of the loads P, P_1, or P_2 depending upon their amounts and spacing if W_2 is neglected.

Let R = Reaction at Left Support.

Bending Moment at P = $M_p = Ra - \frac{W_2 a^2}{2l}$.

Bending Moment at P_1 = $M_{p1} = Ra_1 - \left[\frac{W_2 a_1^2}{2l} + P(a_1 - a)\right]$.

Bending Moment at $P_2 = M_{p2} = Ra_2 - \left[\frac{W_2 a_2^2}{2l} + P_1(a_2 - a_1) + P(a_2 - a)\right]$.

Shear or Reaction at Left Support = $\frac{P_2 b_2 + P_1 b_1 + Pb}{l} + \frac{W_2}{2}$.

Shear or Reaction at Right Support = $\frac{P_2 a_2 + P_1 a_1 + Pa}{l} + \frac{W_2}{2}$.

Diagram for Superimposed Load:—Draw as in Case (5) the Ordinates FC, GD and HE representing the bending moments due to loads P, P_1 and P_2 respectively. Produce FC to P, making PC = FC + IC + JC; GD to Q, making QD = GD + KD + LD; and HE to R, making RE = HE + ME + NE. Join the points A, P, Q, R and B, then the ordinates between A B and polygon A P QRB will represent the bending moments for corresponding points on beam.

(8) Beam Fixed at both ends and Uniformly Loaded.

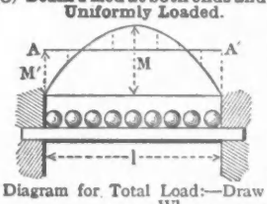


Diagram for Total Load:—Draw parabola having $M = \frac{Wl}{8}$. Also A A' parallel to base and at a distance $M' = \frac{Wl}{12}$. The Vertical distances between the parabola and line A A' are the moments for corresponding points on beam.

Safe Superimposed Load, in lbs., uniformly distributed, $W'_s = \frac{3}{4}W_s - W_2$.

Distance of points of contra-flexure from supports = .2113l.

Maximum Bending Moment at points of support = $\frac{Wl}{12} = \frac{(W_1 + W_2)l}{12}$.

Bending Moment at middle of beam = $\frac{Wl}{24} = \frac{(W_1 + W_2)l}{24}$.

Maximum Shear at points of support = $\frac{W_1 + W_2}{2}$.

Maximum Deflection = $\frac{Wl^3}{384EI} = \frac{(W_1 + W_2)l^3}{384EI}$.

(9) Beam Fixed at both ends with Load Concentrated at the Middle.

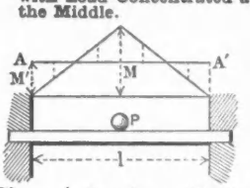


Diagram for Superimposed Load:—
Draw triangle having $M = \frac{Pl}{4}$. Also A A' parallel to base and at a distance $M' = \frac{Pl}{8}$. The Vertical distances between the triangle and line A A are the moments for corresponding points on beam.
Diagram for Dead Load similar to Case (8).

Safe Superimposed Load, in lbs., concentrated, $P_s = W_s - \frac{3}{4}W_2$.

Distance of points of contra-flexure from supports = $\frac{1}{4}l$.

Maximum Bending Moment at points of support = $\frac{Pl}{8} + \frac{W_2 l}{12}$.

Bending Moment at middle of beam = $\frac{Pl}{8} + \frac{W_2 l}{24}$.

Maximum Shear at points of support = $\frac{P + W_2}{2}$.

Maximum Deflection = $\frac{Pl^3}{192EI} + \frac{W_2 l^3}{384EI}$.

Rules Relative to the Circle

To Find Circumference:
Multiply diameter by 3.1416,
or divide " " 0.3183.

To Find Diameter:
Multiply circumference by 0.3183,
or divide " " 3.1416.

To Find Radius:
Multiply circumference by 0.15915,
or divide " " 6.28318.

To Find Side of an Inscribed Square:
Multiply diameter by 0.7071,
or multiply circumference by 0.2251,
" divide " " 4.4428.

To Find Side of an Equal Square:
Multiply diameter by 0.8862,
or divide " " 1.284,
" multiply circumference by 0.2821,
" divide " " 3.545.

Square.
A side multiplied by 1.1442 equals diameter of its circumscribing circle.
A side multiplied by 4.443 equals circumference of its circumscribing circle.
A side multiplied by 1.128 equals diameter of an equal circle.
A side multiplied by 3.547 equals circumference of an equal circle.
Square inches multiplied by 1.273 equal circle inches of an equal circle.

To Find the Area of a Circle:
Multiply circumference by one-quarter of the diameter,
or multiply the square of diameter by 0.7854,
" " " " " circumference by 0.07958,
" " " " " ½ diameter " 3.1416.

To Find the Surface of a Sphere or Globe:
Multiply the diameter by the circumference,
or multiply the square of diameter by 3.1416,
" " four times the square of radius by 3.1416.

To Find the Weight of Brass and Copper Sheets, Rods, and Bars:
Ascertain the number of cubic inches in piece and multiply same by weight per cubic inch—
Copper, 0.3212.
Brass, 0.2972.
Or multiply the length by the breadth (in feet) and product by weight in pounds per square foot.

Table of Square Roots

No.	Sq. Root	No.	Sq. Root	No.	Sq. Root	No.	Sq. Root
25	5.	650	25.46	1400	37.42	2600	50.99
50	7.071	700	26.46	1450	38.08	2700	51.96
75	8.66	750	27.39	1500	38.73	2800	52.91
100	10.00	800	28.28	1550	39.37	2900	53.85
125	11.18	850	29.15	1600	40.00	3000	54.77
150	12.25	900	30.00	1650	40.62	3200	56.57
175	13.23	950	30.82	1700	41.23	3400	58.30
200	14.14	1000	31.62	1800	42.43	3600	60.00
250	15.81	1050	32.40	1900	43.59	3800	61.64
300	17.32	1100	33.16	2000	44.72	4000	63.24
350	18.70	1150	33.91	2100	45.82	4200	64.80
400	20.00	1200	34.64	2200	46.90	4400	66.32
450	21.21	1250	35.36	2300	47.95	4600	67.82
500	22.36	1300	36.06	2400	48.99	4800	69.28
550	23.45	1350	36.74	2500	50.00	5000	70.72
600	24.49						

Surveyors' Square Measure

625 square links = 1 square rod.
16 " rods = 1 " chain.
10 " chains = 1 acre.
640 acres = 1 square mile.
36 square miles or 6 miles square = 1 township.

Surveyors' Long Measure

7.92 inches = 1 link.
25 links = 1 pole.
100 links = 1 chain.
10 chains = 1 furlong.
8 furlongs = 1 mile.
Used by surveyors, civil engineers, etc., in measuring distances.

Life of Parts, and Depreciation, in a Wood Frame House

	Average Life Years	Annual Depreciation Per Cent
Plastering	20	5
Painting, outside	5	20
Painting, inside	7	14
Shingles	16	6
Cornice	40	2½
Weatherboarding	30	3½
Sheathing	50	2
Flooring	20	5
Flooring (entirely carpeted)	40	2½
Doors, complete	30	3½
Windows, complete	30	3½
Stairs and newels	30	3½
Base	40	2½
Building Hardware	20	5
Outside blinds	16	5
Sills and floor joists	15	4
Dimension lumber	50	2
Porches	20	5

Mensuration Tables, Etc.

Linear Measure

1 hair's breadth = 1/48 inch.
3 barleycorns (lengthwise) = 1 inch.
7.92 inches = 1 link.
12 inches = 1 foot = 0.3048 metre.
3 feet = 1 yard = 0.91438 metre.
5½ yards = 1 rod, perch, or pole.
4 poles or 100 links = 1 chain.
10 chains = 1 furlong.
8 furlongs = 1 mile = 1.6093 kilometres = 5280 feet.
3 miles (nautical) = 1 league.
1 line = 1/12 inch.
1 nail (cloth measure) = 2¼ inches.
1 palm = 3 inches.
1 hand (used for height of horses) = 4 inches.
1 span = 9 inches.
1 cubit = 18 inches.
1 pace (military) = 2½ feet.
1 pace (common) = 3 feet.
1 Scotch ell = 37.06 inches.
1 vara (Spanish) = 33.3 inches.
1 English ell = 45 inches.
1 fathom = 6 feet.
1 cable's length = 120 fathoms.
1 "knot" = 6082.66 feet.
1 degree of equator = 69.1613 statute miles.
1 degree of equator = 60 geographical miles.
1 degree of meridian = 69.046 statute miles.
1 degree of meridian = 59.899 geographical miles.
1.1527 statute miles = 1 geographical mile.
6086.07 feet = 1 minute of longitude = 1 nautical mile.
5280 feet = 1 statute mile.

Circular Measure

60 seconds = 1 minute
60 minutes = 1 degree
30 degrees = 1 sign
12 signs = 1 circle or circumference

Cubic Measure

1,728 cubic inches = 1 cubic foot
27 cubic feet = 1 cubic yard

Square Measure

144 square inches = 1 square foot
9 square feet = 1 square yard
30¼ square yards = 1 square rod
40 square rods = 1 rood
4 roods = 1 acre
640 acres = 1 square mile
36 square miles = 1 township

Decimal Equivalents of Common Fractions

1/8 = .0625	9/16 = .5625
5/16 = .125	5/8 = .625
1/4 = .1875	11/16 = .6875
7/16 = .25	3/4 = .75
3/8 = .3125	13/16 = .8125
7/16 = .375	7/8 = .875
1/2 = .4375	15/16 = .9375
9/16 = .5	

TWELFTHS

1/12 = .0833	7/12 = .5833
2/12 = .1667	8/12 = .6667
3/12 = .2500	9/12 = .7500
4/12 = .3333	10/12 = .8333
5/12 = .4167	11/12 = .9167
6/12 = .5000	

Miscellaneous Data

FORCE OF THE WIND

Description	Miles per hour	Feet per minute	Feet per second	Force in lbs. per sq. foot
Hardly perceptible	1	88	1.47	0.005
Just perceptible	2	176	2.93	0.02
	3	264	4.4	0.044
Gentle breeze	4	352	5.87	0.079
	5	440	7.33	0.123
Pleasant breeze	10	880	14.67	0.492
	15	1,320	22	1.107
Brisk gale	20	1,760	29.3	1.968
	25	2,200	36.6	3.075
High wind	30	2,640	44	4.428
	35	3,080	51.3	6.027
Very high wind	40	3,220	58.6	7.872
	45	3,960	66	9.963
Storm	50	4,400	73.3	12.300
Great storm	60	5,280	88	17.712
	70	6,160	102	24.108
Hurricane or cyclone	80	7,040	117.3	31.488
	100	8,800	146.6	49.200

Standard Lumber Abbreviations

THE Forest Products Laboratory of the U. S. Forest Service recommends as standard the following abbreviations of terms used by the lumber industry. Most of the forms given correspond to those already in common use. In a few cases new abbreviations have been suggested where the old forms overlapped or were misleading.

AD—Air-dried.
a. l.—All lengths.
av.—Average.
av. w.—Average width.
av. l.—Average length.
a. w.—All widths.
B1S—Beaded one side.
B2S—Beaded two sides.
BBS—Box bark strips.
bd.—Board.
bd. ft.—Board foot.
bdl.—Bundle.
bdl. bk. s.—Bundle bark strips.
Bev.—Bevelled.
B/L—Bill of lading.
b. m.—Board (foot) measure.
Btr.—Better. Also Bet.
c. i. f.—Cost, insurance, and freight.
c. i. f. e.—Cost, insurance, freight, and exchange.
Clg.—Ceiling. Also C/G and Ceil.
Clr.—Clear. Also Cl.
Com.—Common.
Coop.—Cooperage (stock).
CM—Center matched; i. e., the tongue and groove joints are worked along the center of the edges of the piece.
Csg.—Casing. Also C/S.
Ctg.—Crating.
cu. ft.—Cubic foot.
Cust.—Custom (sawed).
D&CM—Dressed (one or two sides) and center matched.
D&H—Dressed and headed; i. e., dressed one or two sides and worked to tongue and groove joints on both the edges and the ends.
D&M—Dressed and matched; i. e., dressed one or two sides and tongued and grooved on the edges. The match may be center or standard.
D&SM—Dressed (one or two sides), standard matched.
D2S&CM—Dressed two sides, center matched.
D2S&M—Dressed two sides and (center or standard) matched.
D2S&SM—Dressed two sides and standard matched.
Dim.—Dimension.
D. S.—Drop siding. Also D/S. Synonymous with cove siding (C. S.), novelty siding (N. S. and Nov. Sdg.), and German siding G. S.).
E—Edge. Also Ed. and Edg.
E&CB1S—Edge and center bead one side; i. e., surfaced one or two sides and with a longitudinal edge and center bead on a surfaced face. Also B&CB1S.
E&CB2S—Edge and center bead two sides; i. e., all four sides surfaced and with a longitudinal edge and center bead on the two faces. Also B&CB2S.
ECM—Ends center matched.
E&CV1S—Edge and center V one side. Also V&CV1S.
E&CV2S—Edge and center V two sides. Also V&CV2S.
EM—End matched — either center or standard.
ESM—Ends standard matched.
exp.—Export (lumber or timber).
f. bk.—Flat back.
FAS—First and Seconds—a combined grade of the two upper grades of hardwoods.
f. a. s. vessel (named port).—Free along side vessel at a named port.
Fcty.—Factory (lumber). Also Fact.
F. G.—Flat grain. Synonymous with slash grain (S. G.) and plain sawed (P. S.).
Flg.—Flooring. Also F/G.
f. o. b. (named point).—Free on board at a named shipping point.
f. o. k.—Free of knots.
f. o. w.—First open water.
Frm.—Framing.
ft.—Foot or feet.
ft. b. m.—Feet board measure.
ft. s. m.—Feet surface measure.
Furn.—Furniture (stock).
G. R.—Grooved roofing.
h. bk.—Hollow back.
Hdl.—Handle (stock).
hdwd.—Hardwood.
Hrt.—Heart.
Hrtwd.—Heartwood.
1s&2s—Ones and twos — a combined grade of the hardwood grades of Firsts and Seconds.
Impl.—Implement (stock).
in.—Inch or inches. Also two accent marks (").
KD—Kiln-dried. Also K/D.
k. d.—Knocked down.
lbr.—Lumber.
l. c. l.—Less carload lots.
lgth.—Length.
lgr.—Longer.
lin. ft.—Lineal foot; i. e., 12 inches.
Lng.—Lining.
LR—Log run.
LR, MCO.—Log run, mill culls out.
Lth.—Lath.
M—Thousand.
M b. m.—Thousand (feet) board measure.
MCO—Mill culls out.
Merch.—Merchantable.
m. l.—Mixed lengths.
Mldg.—Moulding.
MR—Mill run.
M s. m.—Thousand (feet) surface measure.
m. w.—Mixed widths.
No.—Number.
Ord.—Order.
P.—Planed — used synonymously with dressed and surfaced as P2S&M, meaning planed two sides and matched.
Pat.—Pattern.
Pky.—Pecky.
Pn.—Partition. Also Part'n.
Prod.—Production. Also Prod'n.
Ptd.—Quartered—when referring to hardwoods. Also see V. G.
rdm.—Random.
res.—Resawed.
Rfg.—Roofing.
Rfrs.—Roofers.
rip.—Ripped.
r. l.—Random lengths.
rnd.—Round. Also rd.
R. Sdg.—Rustic siding.
r. w.—Random widths.
S&E—Surfaced one side and edge.
S1E—Surfaced one edge.
S2E—Surfaced two edges.
S1S—Surfaced one side.
S2S—Surfaced two sides.
S1S1E—Surfaced one side and one edge.
S2S1E—Surfaced two sides and one edge.
S1S2E—Surfaced one side and two edges.
S4S—Surfaced four sides.
S4SCS—Surfaced four sides with a calking seam on each edge.
S&CM—Surfaced (one or two sides) and center matched.
S&M—Surfaced and matched; i. e., surfaced one or two sides and tongued and grooved on the edges. The match may be center or standard.
S&SM—Surfaced (one or two sides) and standard matched.
S2S&CM—Surfaced two sides and center matched.
S2S&M—Surfaced two sides and (center or standard) matched.
S2S&SM—Surfaced two sides and standard matched.
Sap.—Sapwood.
SB—Standard bead.
Sd.—Seasoned.
Sdg.—Siding. Also Sidg. and S/G.
Sel.—Select.
S. E. Sdg.—Square-edge siding.
s. f.—Surface foot; i. e., an area of one square foot.
Sftwd.—Softwood.
Sh. D.—Shipping dry.
Ship.—Shipment or shipments.
Shlp.—Shiplap. Also S-L and S/L.
s. m.—Surface measure. Synonymous with face measure (f. m.).
SM—Standard matched.
smkd.—Smoked (dried).
smk. stnd.—Smoke stained.
s. n. d.—Sap no defect.
snd.—Sound.
sq.—Square.
Sq. E&S—Square edged and sound.
Sqrs.—Squares.
Std.—Standard.
stnd.—Stained.
stk.—Stock.
Stp.—Stepping.
S. W.—Sound wormy.
T&G—Tongued and grooved.
TB&S—Top, bottom, and sides.
Tbrs.—Timbers.
V1S—V one side, i. e., a longitudinal V-shaped groove on one face of a piece of lumber.
V2S—V two sides, i. e., a longitudinal V-shaped groove on two faces of a piece of lumber.
V. G.—Vertical grain. Synonymous with edge grain (E. G.), comb grain, (C. G.), quarter-sawed (Q. S.), quartered (Qtd.), and rift-sawed (R. S.).
w. a. l.—Wider, all lengths.
Wth.—Width.
wdr.—Wider.
Wgn.—Wagon (stock).
wt.—Weight.

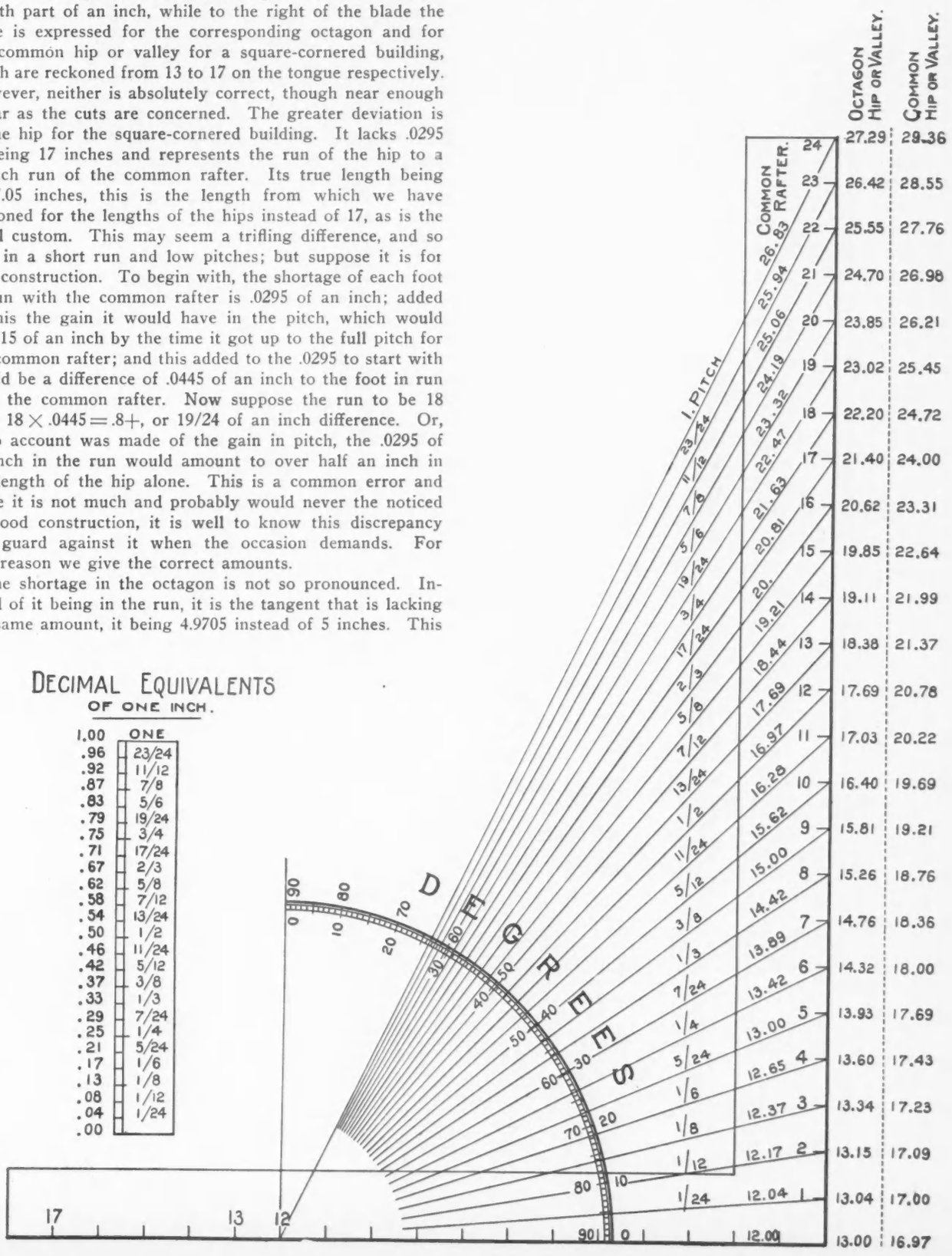
Roof Pitches and Degrees

THE accompanying diagram showing an easy practical method of determining angles on the steel square will be found extremely practical and helpful. Read the following explanation carefully.

The fractional pitch lines for the common rafter are shown for each inch in rise up to the full pitch, and their lengths are expressed in decimal figures to the one-hundredth part of an inch, while to the right of the blade the same is expressed for the corresponding octagon and for the common hip or valley for a square-cornered building, which are reckoned from 13 to 17 on the tongue respectively. However, neither is absolutely correct, though near enough as far as the cuts are concerned. The greater deviation is in the hip for the square-cornered building. It lacks .0295 of being 17 inches and represents the run of the hip to a 12-inch run of the common rafter. Its true length being 16.97.05 inches, this is the length from which we have reckoned for the lengths of the hips instead of 17, as is the usual custom. This may seem a trifling difference, and so it is in a short run and low pitches; but suppose it is for iron construction. To begin with, the shortage of each foot in run with the common rafter is .0295 of an inch; added to this the gain it would have in the pitch, which would be .015 of an inch by the time it got up to the full pitch for the common rafter; and this added to the .0295 to start with would be a difference of .0445 of an inch to the foot in run with the common rafter. Now suppose the run to be 18 feet; $18 \times .0445 = .8+$, or 19/24 of an inch difference. Or, if no account was made of the gain in pitch, the .0295 of an inch in the run would amount to over half an inch in the length of the hip alone. This is a common error and while it is not much and probably would never the noticed in wood construction, it is well to know this discrepancy and guard against it when the occasion demands. For that reason we give the correct amounts.

The shortage in the octagon is not so pronounced. Instead of it being in the run, it is the tangent that is lacking the same amount, it being 4.9705 instead of 5 inches. This coming as it does cannot affect the length of the rafter nearly so much as in the above.

In connection with this illustration we also give a table of decimal equivalents to the one-twenty-fourth part of an inch for convenience in finding their value in common fractions.



DECIMAL EQUIVALENTS OF ONE INCH.

1.00	ONE
.96	23/24
.92	11/12
.87	7/8
.83	5/6
.79	19/24
.75	3/4
.71	17/24
.67	2/3
.62	5/8
.58	7/12
.54	13/24
.50	1/2
.46	11/24
.42	5/12
.37	3/8
.33	1/3
.29	7/24
.25	1/4
.21	5/24
.17	1/6
.13	1/8
.08	1/12
.04	1/24
.00	

YPS

Choose Quality

FIREPROOFING

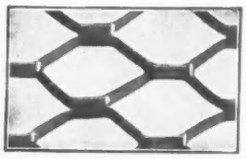
BUILDERS all over the country expect certain things in every product identified with the YPS Oval—and of those things, "quality" is the leader.

It is a matter of pride with the Youngstown Pressed Steel Company that its products first of all may be known as Quality Products. *And so they will be!* Each YPS product is always composed of materials of the highest grade—something builders know they can depend on—something that helps produce finished jobs of which you

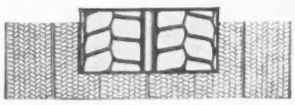
The Youngstown

164 University Road,

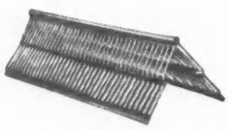
New York Philadelphia
Los Angeles



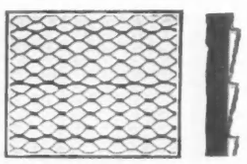
Mahoning Metal Lath is an excellent base for guaranteed plaster work. It helps you greatly because the sheets are absolutely flat and rigid with straight parallel sides. Mahoning's small, uniformly expanded mesh easily takes from the trowel the necessary minimum of mortar to make a perfect plaster job. Adapted to all types of interior plastering and especially easy to erect as a base for ornamental plaster cornices, arches, column capitals, mouldings and other intricate work. Manufactured from the best grade open hearth steel, furnished painted black; copper bearing steel painted red; and galvanized.



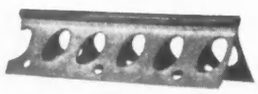
Ideal Rib Lath is easy to plaster. It is not only rigid *with* the ribs but also has great *cross* rigidity due to the peculiar twist of strands. Just enough resiliency to take plaster from trowel properly. Twist gives a strong key to even a thin scratch coat. Perfect results with economy.



Protex Corner Bead has great rigidity, wide fastening surface and is put up easily and quickly. *Reinforces* as well as *protects* the corner. Its wide wings produce well formed keys of plaster all around the nose. Its crosswise-lengthwise rigidity eliminates all possibility of buckling or twisting in erection.



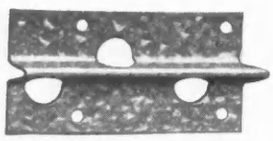
Zee Self-furring Lath. Saves cost of extra material and labor required to erect furring. Especially recommended for overcoating old residences. Zee lath costs the same as Mahoning which makes it the logical lath to use where Mahoning and furring strips would otherwise be needed. Eliminates cost of extending door and window frames since the thickness of the lath and stucco equals old clapboard thickness. Zee lath is also recommended for back-plastered stucco work.



Youngstown Corner Bead is the most rigid wing type bead made. Comes absolutely straight and true. Great savings in erection costs. Provides true guide line for the finished plaster; actually saves money over a hand-turned corner.



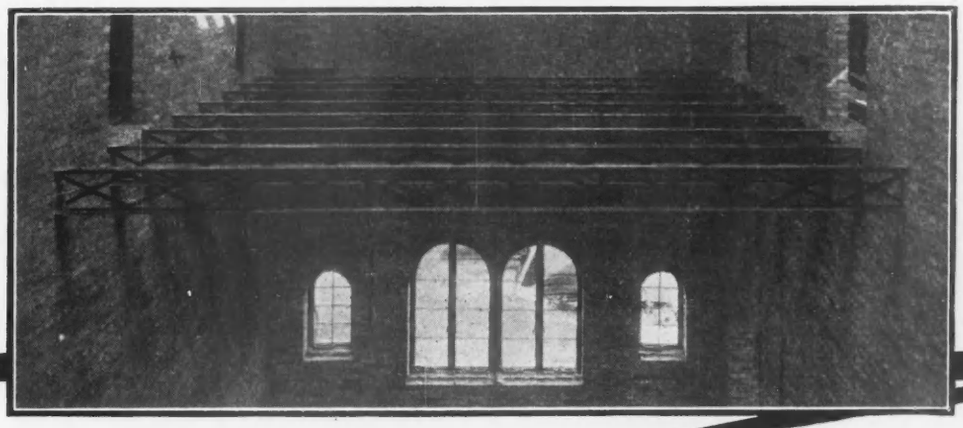
Parker Corner Bead, the original rail type corner bead, is preferred by many of the best men in the country. Construction is such that plaster fastens itself on both sides of bead and back of it, forming a solid corner with a steel reinforcement. This bead is erected with galvanized clips, one clip being furnished with each foot of bead. Clips hold the bead firm and true.



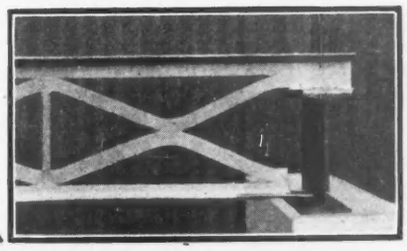
Sharon Base Bead gives a neat, clearly defined line to guide the workman, makes an ideal ground for both plasterer and cement man; keeps cement from staining the plaster. A great time and labor saver, assuring an entirely satisfactory job.

Just Off The Press —The latest edition of the YPS Fireproofing Catalog is ready. Gives complete specifications on ALL YPS fireproofing products. A copy should be in your office. Write or use the coupon.

YPS Means Quality— Materials and Service



BATES
EXPANDED JOISTS



ONE PIECE OF STEEL

The Expanded Section is covered by basic commodity and process patents, owned, controlled and operated under exclusively by this company.

Bates Expanded Steel Truss Co.
General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

THE BATES EXPANDED JOIST is made from one piece of steel. It does not depend upon welds, rivets or bolts for its structural strength. Architects and engineers will appreciate the advantages which this new joist offers.

The Joists are made from new billet, open hearth, structural steel. The process of manufacture tests the steel of each joist automatically, assuring the purchaser that each joist will function as designed.

The expanded web of the joist is open. . All plumbing, heating and wiring pipes and conduits can be run in straight lines.

Furring down of the ceiling is eliminated. Ceiling lath can be fastened directly to the bottom flanges of the joist.

Bates Joists are furnished in 8″, 10″, 12″ and 14″ depths, and in any desired lengths up to 35′. Each joist has a 9″ variable length.

Bates One-Piece Expanded Sections have been used for many years in industrial railway and municipal pole installations—in all parts of the world. The Bates Expanded Joist is just another application of the proven principles of expanded truss sections.

BATES EXPANDED STEEL JOISTS

An Overhead Garage Door

A NEW type of door, originally designed for the small private garage, has proven so practical and useful that it is being adopted extensively in the construction of factories and warehouses and to replace old doors in many types of building. This door is made up of panels hinged together with a combination fixture hinge. A door 8 feet high has four panels and as the height is increased the number of panels is increased.

Ball bearing rollers, attached to the panels, are guided within a steel track and as the door moves upward and from the vertical to the horizontal position, in opening, it is impossible for these rollers to leave the track, due to the special construction of the track.



Doors Which Slide Up Into an Overhead Position Are Always Out of the Way, Are Never Damaged by Being Banged by the Wind and Are Not Injured by Rain, Snow or Ice.

The interesting features of this door are its economy of space and its out-of-the-way character. Disappearing upward, it rests in a horizontal position above door opening. It takes up no floor space when open and is entirely out of the way. It eliminates the sag common to poorly hung doors. This door is counter-balanced by a spring adjustment to the desired tension and can be so adjusted that a child can easily operate it. Only an up or down pressure is required for opening or closing.

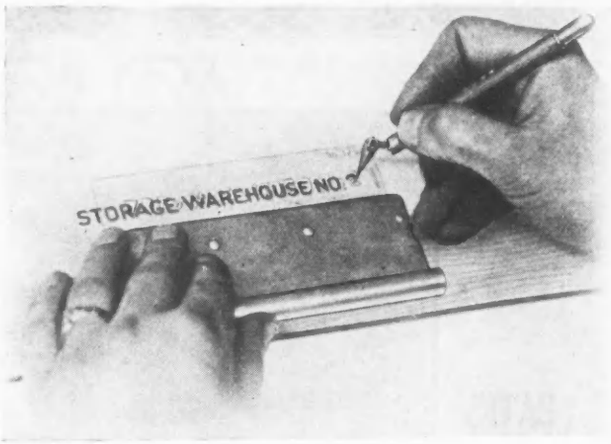
Because of its position inside the garage or other building when open, it is protected from banging and from the effects of rain, snow and ice so that it will not swell or warp and the snow and ice will not interefere with its operation. The average carpenter can assemble and install this door in a few hours' time.

✣

A Rapid Lettering Device

A SIMPLE device, which enables anyone, with or without experience, to letter engineering and architectural drawings, maps, signs, and so on, with the utmost neatness and correctness as to uniformity of size and evenness of line, has recently been developed. With it results are obtained in less time, even by the inexperienced, than the same quality of lettering could be secured by the most experienced draftsman with the usual method, using an ordinary straight-edge, pencil, scale and pen. Lettering can be done at once without any preliminary lay-out.

With this device no guide lines are required. A template is manipulated by means of a metal guide into the jaws of which it is inserted. The shoulder of the guide is held against the working edge of the straight-edge, the body of the guide resting on its face. By this means the template is moved precisely along one line and kept far enough above the lettering surface to avoid any smearing of the lettering.



This Device Makes It Possible for Anyone, Without Experience, to Letter Plans With the Utmost Neatness and Accuracy and Very Rapidly.

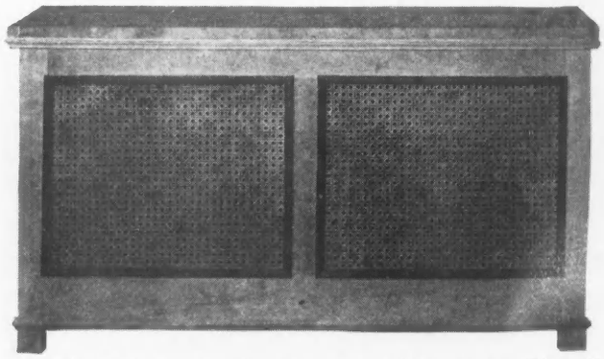
The template is designed to require as few openings as are compatible with rapid and effective work. Many characters can be drawn by means of a single opening, but where the character is of a form that one opening will not complete it, no more than two openings are ever required. The complete device consists of the guide, templates, and pen.

✣

Perforated Metal Grilles

PERFORATED metal grilles, made from bronze, brass and steel, are being used with much satisfaction because of their light weight and high tensile strength. The grilles, manufactured by a company specializing in this work, are perforated with great care, making the rows of perforations and margins uniformly square and leaving the face smooth, true and flat.

One of the newest and most generally useful products of this company is a cane grill adapted to use for radiator covers. It is regularly made of the best pickled steel, free



A Metal Grill, Perforated and Finished to Give the Appearance of Cane Work Improves the Appearance of the Home and Adds Usefulness to the Radiator Making It Available as a Seat.

from scale, which makes it suitable for taking a high class finish. It is also furnished in bronze, brass, copper or aluminum. These cane style grilles are carried in stock sheets 30 by 96 inches, 24 by 96 inches and 18 by 120 inches, and are also cut to size if required.

✣

The Detroit Steel Products Company, Detroit, Mich., has just published a booklet, "The New Window Vogue for the Home Beautiful," which contains many illustrated suggestions for interior decoration.

(*Department continued to page 648.*)

LOW COST Sewage Disposal

Kaustine Super-Septic Tanks Are Ready-Built, Easily Installed

INSTALL a septic tank which **costs nothing to operate** and requires practically no attention.

Your septic tank must be **designed correctly;** very few home-made tanks are properly designed. It must be **installed correctly;** do you know just where and how to install it?

Kaustine Is the Answer

It is designed by engineers who are pioneers in the septic tank business. There is a size for every requirement—from the small cottage to the suburban or town development.

Expert Installation Advice FREE

The Kaustine Engineering Department stands ready to solve your installation problem, without charge. This means a satisfactory sewage disposal system that will operate correctly for many years.

Special Patented Design

You get, in the Kaustine Super-Septic Tank, the very latest improvement in septic tank design. This tank has distinct advantages over any other tank made.



ARMCO-INGOT IRON
The Purest Iron Made
"Make Comparative Analyses"

There is no material that can compare with Armco Ingot Iron for septic tanks. Armco is used in all Kaustine Super-Septic Tanks and it is further protected by the use of Hermastic Enamel, inside and out.

The inlet and outlet connections are designed to take either four-inch or six-inch pipe. The cover has a fourteen-inch manhole in addition to being removable itself.

SPECIFICATIONS

Dimensions	Total Capacity	Working Capacity	Number of Persons Designed to Accommodate				Approximate Shipping Weight
			Home	Hotel	Factory	School	
32" x 50"	170 gals.	140 gals.	4 persons	.....	.....	.....	240 lbs.
38" x 50"	245 gals.	200 gals.	7 persons	8 persons	10 persons	12 persons	265 lbs.
48" x 50"	390 gals.	320 gals.	10 persons	12 persons	15 persons	20 persons	375 lbs.
55" x 60"	615 gals.	535 gals.	17 persons	20 persons	25 persons	32 persons	560 lbs.
65" x 60"	860 gals.	735 gals.	25 persons	30 persons	35 persons	50 persons	920 lbs.
75" x 60"	1150 gals.	1000 gals.	35 persons	50 persons	65 persons	80 persons	1099 lbs.
79" x 84"	1780 gals.	1500 gals.	50 persons	75 persons	100 persons	125 persons	1462 lbs.

Whatever your sewage disposal problem may be, write to us for our suggestions and for Booklet No. 204. **We can save you money** by recommending the most practical installation and by proving the most up-to-date, most widely used septic tank equipment.

Address your letter to

Kaustine Co., Inc.

Manufacturers and Sanitation Engineers

BUFFALO, N. Y.

In Canada: Kaustine Mfg. Co., Ltd., Dundas, Ont.

Experiments Are Risky

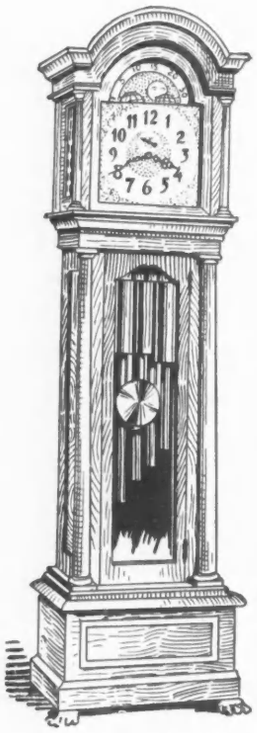
A very slight error in calculation or in construction will make a home-made septic tank a source of constant trouble.

It **costs no more** to install a ready-built Kaustine Super-Septic Tank which must function correctly because thousands of tests have eliminated the elements of chance.

Kaustine Super-Septic Tanks
Sold and Installed by Plumbers Everywhere

Hall Clocks for a Side Line

MANY contractors have found that by taking on specialties which can be turned out in slack times they are able to keep together a good crew of workmen, to keep their equipment busy all through the year, cut down overhead expense and add a very attractive item of profit to their books. For those who are on the lookout for such specialties the hall clock, sometimes known as the "Grandfathers" clock, offers an excellent opportunity. Such clocks have always been popular and today, with Colonial houses and Colonial furniture enjoying a greater popularity than ever, they are a particularly appropriate addition to the home.



A Hall Clocked Case Finished and Equipped with a Handsome Dial and Works.

The making of such clocks is greatly simplified if good plans are available and these can be secured through a company which specializes in furnishing clock plans and works. The blue prints furnished include full sized details and bills of material so that no difficulty is experienced in turning out highly salable clocks. When made in mahogany, walnut or quartered oak and supplied with good works these clocks bring a price much greater than the cost of materials and labor.

Both dials and works are supplied for these clocks and may be had in a great variety of styles and prices. Some of the dials are quite plain while some of the finer ones are of brass with gold plated corners, enameled etched numerals, lunar arch and movable moon. It is advisable to select and obtain the dial, if not the works also, before laying out the case of the clock so that it will be sure to fit.



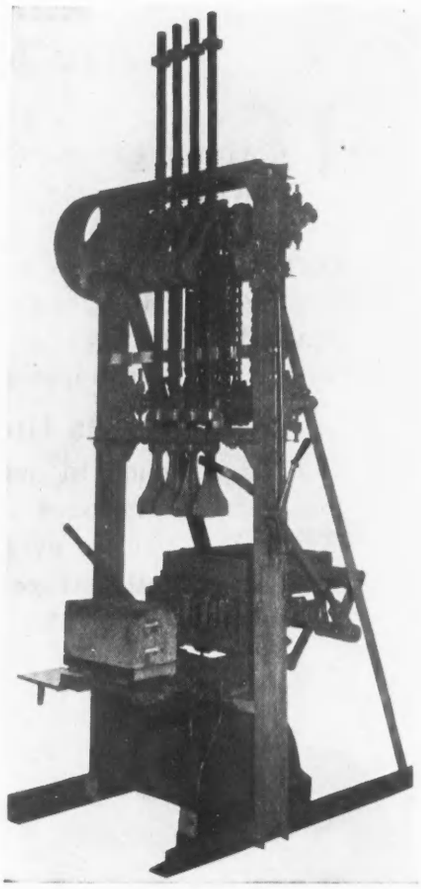
Two Styles of Dial from the Many Offered. The one at the left has the elaborate lunar arch.

Some works, at low prices, are of the simplest sort, striking the half hours, while others are most elaborate. For use with the very fine cases many people prefer the chime movements and these are supplied in varying styles, from a fine, two-chime tubular movement on up to movements having as many as nine tube chimes. These more expensive movements are usually used with the finest inlaid cases, the making of which is worthy of this finest craftsmanship.

✣

Concrete Block Machines for Building Contractors

A NEW development in concrete block producing machinery carries a special appeal to the contractor who wishes to increase the profits in his own concrete construction work or develop a block manufacturing business but whose available capital is limited. The new machinery, which in itself offers a number of distinctive and attractive features, is made in three styles to meet the varying requirements of the contractor. These three types are a small hand machine, a medium sized power operated machine and a large automatic machine.



This Machine for Making Concrete Blocks Was Designed as the Result of Many Years' Experience in the Concrete Field and the Realization of a Need.

The small machine is especially intended for the man who wishes to produce his own block and thereby increase the profits in his own construction work. It also makes possible the development of a manufacturing business in a small way. The investment for such a machine is easily within the means of the average contractor.

Even a business started in a small way can be conveniently expanded by the addition of one or more machines or by the installation of a machine of the next size. The medium sized machine is moderately priced and increases the possible production without requiring a great investment, while the automatic machine makes possible a production of 180 to 240 blocks an hour. All these machines are designed for the production of block with a minimum of labor.

Mechanically the development of this type of machine promises much in the way of greater capacity for the individual machine and, as a result, a correspondingly lower manufacturing cost and greater profit. This is a stripper machine designed to make, strip and deliver, both plain and face blocks on an equal plane of production regardless of the type of block being produced.

The six operations commonly used in manually operated, down face machines, have been taken care of in two operations. In the hand machine a single forward movement of the stripping lever draws the cores, gives the mould box a quarter turn and unfolds the end doors. The reverse action of the lever closes the end doors, turns the mould back to the original position and replaces the cores.

The large automatic machine is so designed that it requires only two horse power to operate, and the motor being a built-in feature, makes it possible to place the machine in any position best suited to the plant and surroundings without regard to other installations.

(*Department continued to page 652.*)

MAILO-BOX

The Modern Built-in Mail Box

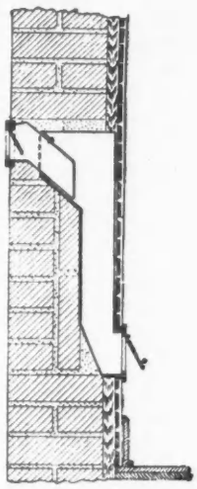
Patented Oct. 4, 1921, July 18, 1922. U. S. and Canada

Make a permanent addition to the home by installing the MAILO-BOX. The MAILO-BOX is a complete unit ready for installation in any kind of house wall Takes only a short time to set in place, and once installed it will never have to be replaced.



Postman deposits mail from outside—occupant gets it from box on inside and both are Sure that All mail will be received in good condition.

A convenient and absolutely safe place in which to deposit letters, magazines and newspapers. Eliminates the old style mail box and thoroughly meets the United States Post Office regulation, requiring a receptacle to insure delivery of mail at residences.



Cross Section of Mailo-Box showing how it is concealed in brick wall.

A great convenience during inclement weather, as all mail is taken from the box INSIDE THE HOUSE.

Beautifies the appearance of any building, as the only parts of the box visible from the outside of the house are the mail reception slot and shutter. On the inside of the house only the entrance door to the box is visible, the box itself being concealed in the wall.

On some models the casting is made with bell button and nameplate. We will be glad to furnish you with full information regarding styles, prices, etc., upon request.



Cross Section of Mailo-Box showing how it is concealed in frame wall.

Types, Styles and Finishes

The Mailo-Box is made in two types, and several styles and finishes. The concealed portion is made of high grade galvanized iron with electro-welded joints. Size of box in all but two styles (E and H) is 10 inches wide, 21 inches long, and 3½ inches deep (from front to back). Built to take all newspapers and magazines.



Made in 7 Styles, for Frame, Stucco, Brick and Stone Walls

Can Be Set in Any Wall

Mailo-Box is adjustable to any thickness of outside wall, regardless of material used. For frame or stucco walls it is adjustable from 3½ to 7 inches. For brick or brick veneer walls from 9½ to 14 inches. Can also be installed in homes already built.

SOLD BY WHOLESALE AND RETAIL HARDWARE DEALERS THRUOUT THE UNITED STATES
SOLD BY LUMBER AND BUILDER'S SUPPLY DEALERS THRUOUT THE UNITED STATES

For further details and literature, write to: **PENN-GREG MANUFACTURING CO.** 809-11 University Ave. ST. PAUL, MINN.

OHIO WHITE FINISHING LIME

"it spreads so easy"

Manufactured by

The Ohio Hydrate & Supply Co.

Woodville, Ohio

"The Lime Center of the World"

Made in Four Brands

Ohio White Finishing Lime is made in four brands, Ohio, Woodville, Buckeye and Hawk Spread White Finishes, distinguished by the four trade-marks shown here.

Each brand is of the same high quality, will produce the same result, and is guaranteed to meet the standard specifications of the American Society for testing materials.



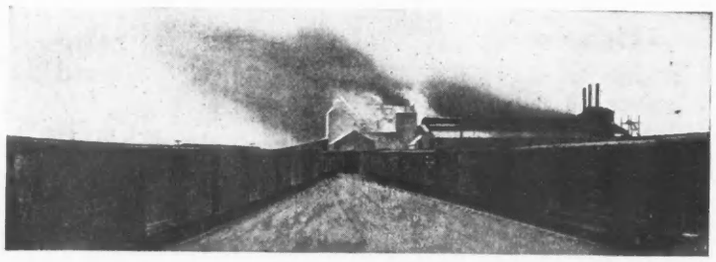
Better Walls

Nothing adds more charm than beautiful walls. Permanently beautiful, snowy white walls are easily obtained through the use of Ohio White Finishing Lime.

It not only gives a lasting finish, but also produces a fire-resisting, metal-preserving, acoustics-improving wall. No matter whether walls be tinted, painted, or papered there is no chipping, cracking or blistering.

These results are due to the unusual purity and peculiar natural composition of the dolomitic lime stone from which it is made. Being exceedingly "fat" or plastic it provides maximum coverage with minimum of labor and material.

In humble cottage, luxurious mansion or office building, Ohio White Finishing Lime accomplishes the extraordinary because it is a better-than-ordinary Lime.



For White Coating

If closely examined under a microscope, the white coating in which any Ohio White Finish product has been used would be found to be filled with minute pores. Peculiarly enough, these pores play a very important part in the successful acoustics of a room. Although too small for the naked eye to see, they break up and absorb the sound waves, preventing any rebound which is the reason for the echo nuisance where this porosity does not exist.



Another distinct advantage realized is the permanency of the walls which affords a like degree of permanency in the decorations. If white coated walls are allowed to stand undecorated for at least one year, this permits the building to settle so that any cracks which may result from the settling, can be properly filled and allowed to harden. The result is a perfectly smooth, white wall, capable of being made permanently beautiful because of the corresponding permanency of Ohio White Finish Lime.

Scratch and Brown Coats

The uniform quality and unusual plasticity of Ohio White Lime have made it an important factor in high grade interior plaster work, including scratch and brown coats.

As a matter of fact, there is no kind of interior plaster work where Ohio White Lime plaster does not excel. It can be used on all kinds and grades of material with better results in acoustics, light, sanitation, appearance and life of the wall.

Stucco Work

The use of Ohio White Lime as an admixture to cement greatly improves exterior stucco work because of its unusual plasticity and "fatness". This characteristic makes it possible to cover the metal lath with less pressure than is require for ordinary stucco mixtures.

In like manner is the efficiency of the mixture increased for use on wood lath because of the liberal "key" produced. Then, too, the plasticity or workability of the mass aids in effecting a complete "fill" in every crack and crevice. The monolithic surface thus produced prevents any absorption of outside moisture. Naturally this adds greatly to the lasting qualities of the stucco work.

Write for Booklet

Every Contractor, Dealer and Home Builder should read this interesting booklet entitled, "A Job that took a Million Years, or the Tale of the Clam." It tells the story of lime as never told before. A copy will be mailed you post-paid upon request. Write for it today!



Save 20 to 30% Room Space

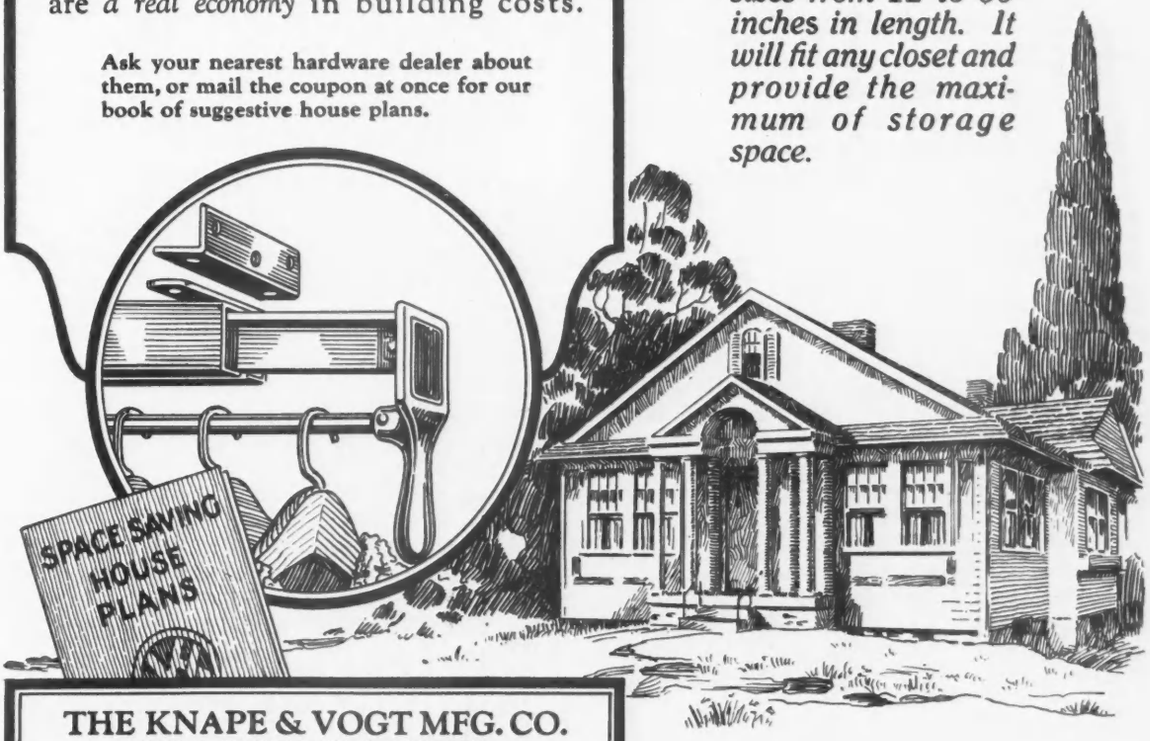
Build small houses that *sell*—houses with *more spacious rooms* and *more convenient, up-to-date clothes closets;* houses that immediately attract housewives—by equipping with Knape & Vogt Clothes Closet Fixtures.

They make possible compact closets which save 20 to 30% room space, and are *a real economy* in building costs.

Ask your nearest hardware dealer about them, or mail the coupon at once for our book of suggestive house plans.

The New K-V Clothes Closet Fixture

An easy-sliding, roller-bearing fixture of nickeled steel. It comes in various sizes from 12 to 60 inches in length. It will fit any closet and provide the maximum of storage space.



THE KNAPE & VOGT MFG. CO.
BOX 22 GRAND RAPIDS, MICHIGAN

Please send me a copy of "K-V Space-Saving House Plans" — no obligation.

NAME_____

STREET_____

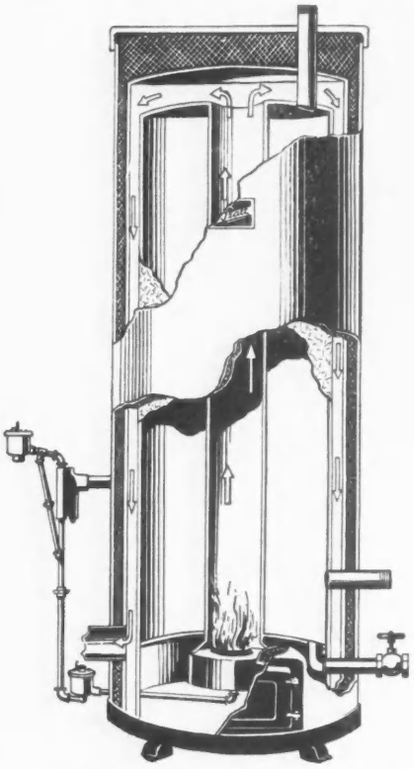
CITY_____

Get your free copy of our illustrated book for contractors, "K-V Space-Saving House Plans." Contains practical suggestions for building more attractive, economical homes. Use the coupon.

KNAPE & VOGT
MANUFACTURING COMPANY
GRAND RAPIDS, MICHIGAN.

Automatic Oil Water Heater

AN automatic water heater for domestic purposes is now being made which uses oil for fuel and which can be converted into an automatic gas water heater almost instantly without any interruption of the water heating service. The control is positively automatic and will maintain any desired temperature of water. The fuel used is regular furnace oil or kerosene. No electricity, gas or pressure is needed and there are no springs, weights or moving parts.



Here Is an Automatic Water Heater Using Oil Fuel Which Can Be Converted Into a Gas Burner Almost Instantly.

The feature of this heater is the special burner which is used. This is a one-piece casting which connects directly with inside or outside oil storage tank. There are no valves to adjust, no physical handling of the oil, no glass containers or air-tight cans and no wicks or wick substitutes requiring trimming or cleaning. This burner has no exposed flame and so is not affected by drafts, there are no drip pans or so-called trip safety devices. The heater is thermostatically operated and the oil shuts off if the burner is out.

Most satisfactory service for the home is obtained from this heater because of the fact that there are no ashes, noise, odor or soot and no adjustments are required. It will perform continuously for months without attention. The application of heat to the heating surface is so adjusted that the heating surface will not burn out as is the case where an intense heat is applied directly to the heating surface and this is effective in prolonging the life of the heater.

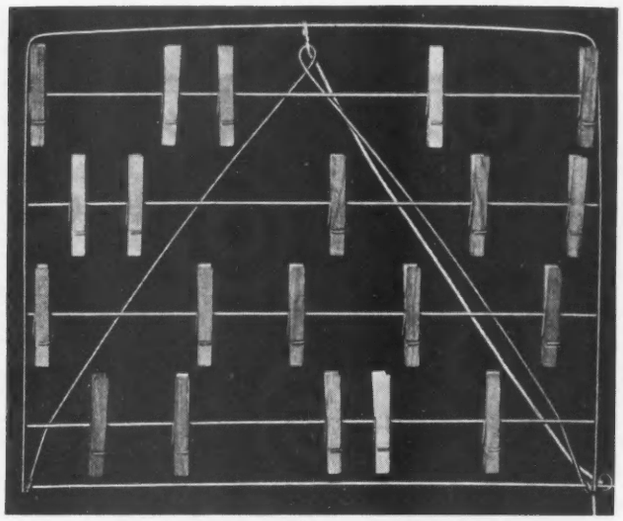
✣

A Convenient Clothes Drier

A RECENTLY introduced household convenience is a clothes drier which can be hung anywhere in the house but is never in the way when not in use. This drier is in the form of a metal frame to which spring clothes pins are permanently attached. Two types of frame are made. One of these is designed to hang against the wall. When in use it is dropped forward from the wall and when not in use is pulled up flat against the wall as shown in the illustration.

The second type is hung from the ceiling and is raised close to the ceiling, and out of the way when in use, by means of cords running over pulleys. It can be lowered to any desired height when clothes are to be dried.

These driers allow free circulation for quick drying, keep the clothes inside out of the dirt and where they may be handled even in cold weather without discomfort. They are rust proof and unbreakable and should last a lifetime with reasonable care. The clothes cannot drop off the pins and the inconvenience of stringing lines across the room is entirely eliminated.



The Clothes Drying Rack As It Appears Folded Against the Wall, Out of the Way But Always Convenient For Use When Wanted.

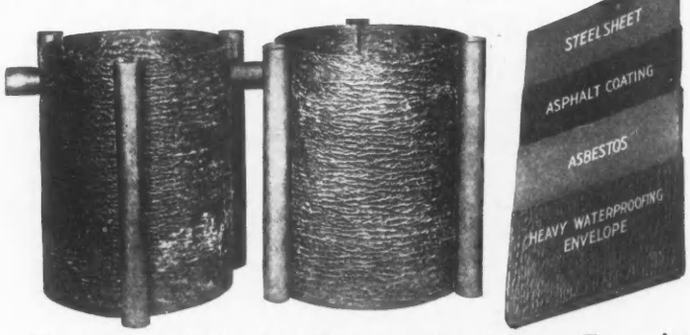
✣

An Improved Septic Tank

SEPTIC tanks which will provide a permanently satisfactory installation can be obtained in knock down form ready to be assembled at the place of installation. These tanks are light in weight and easily handled. They are made of heavy gage steel with triple protective coatings of asphalt, asbestos and a special waterproof covering. They are water proof, rust proof and acid proof, and are scientifically constructed to withstand the earth's pressure and crushing weights.

These tanks are made in various sizes to meet varying requirements and the capacity can easily be increased at any time by the addition of one or more additional units. Because of the light weight of the units transportation costs and the hazards of breakage are reduced to a minimum. Each tank is accompanied by complete instructions for installing and if these instructions are carefully followed the system should give perfect service for an indefinite length of time without requiring any cleaning. No chemicals are used.

Because of the light weight of the units tanks may be easily and quickly installed by one person and the installation does not require skilled labor. These tanks are scientifically correct in design and hold the sewage a sufficient length of time for all solids to become liquefied and give absolutely sanitary disposal.



These Septic Tanks Are Shipped in Knock-Down Form, Are Light in Weight and Have the Permanent Construction Shown at the Right.

(Department continued to page 654.)

For Speedy, Economical Building



You have noticed the increased interest in home building in the class of $3500 and upwards by people who want their own home and yet have not the means to take on a larger investment.

Sheetrock is entering very largely into this type of construction due to its economy and the fact that you can decorate immediately after it is erected, saving time.

Do you know about the new Sheetrock Reinforced Joint System? This makes for smooth, uniform walls, over which our decorative material Textone achieves wonderful period textures—equally adaptable to any type of decoration.

For full information regarding the Reinforced Joint System and other special material, mail coupon.

Sheetrock is inspected and approved by the Underwriters' Laboratories, Inc., as an effective barrier to fire

UNITED STATES GYPSUM COMPANY
General Offices: 205 West Monroe St., Chicago, Ill.

SHEETROCK

The *FIREPROOF* WALLBOARD

Reg. U. S. Pat. Off.

. . . . . *Clip and mail this coupon today!* . . . . . .

UNITED STATES GYPSUM COMPANY, *General Offices:* Department 1, 205 W. Monroe St., Chicago, Ill.

Please send information about the new Sheetrock Reinforced Joint System and your other special data on Sheetrock.

Name.....

Address..... City .....

Sheetrock comes in standard sizes: ⅜ inch thick, 32 or 48 inches wide and 6 to 10 feet long

Better Mail Boxes

BUILT right into the walls of the home in such a manner that it is absolutely concealed from view except for the artistic metal plate where mail is inserted, the modern mail box is so far in advance of the familiar type of detached box that there is no comparison between the two. With such a box the mail is delivered from the outside of the house and received inside the house. It is not necessary to go outside to get it, the box is burglar-proof, no wire or hook thieves can get the mail out of it. No one can examine or tamper with it in any way nor can it be injured by rain.

These boxes are made in various types to fit any position or type of construction and are adjustable to wall thicknesses of 3½ to 7 inches for frame or stucco walls and 8¾ to 13 inches for masonry or brick veneer walls. Where special boxes are required these can be obtained to special order to fit the conditions. The box is assembled ready to be set into the wall and requires only a few minutes for installation. Once installed it will last as long as the walls themselves.

The outside plate is of cast brass or aluminum and is finished in verde green, oxidized or gun black, medium black or statuary bronze and standard hammered iron finishes, the latter at additional cost. Special plates can also be obtained in any style of cast nickel. Plates are also furnished with name plate and door bell incorporated in the plate. Cast brass doors are furnished in either polished or dull finish. The box, inside the wall, is of high grade galvanized iron with locked and electric welded joints. The inside door is high grade cabinet work in oak or birch with natural wood finish. It is equipped with mortised hinges and wood knobs and can be finished to harmonize with the interior woodwork.

✣

Improved Window Sash Sustainer

THE illustration shows a window sash sustainer which has been improved and is fully guaranteed by the manufacturers to effectively sustain the ordinary, sliding sash in position without the use of weights, cords, pulleys and weight boxes. Two of these sustainers will hold one sash weighing not more than 18 pounds and where the two sash weigh more than 18 pounds only one one is required on each sash placed at the right of the lower sash and the left of the upper sash.

The springs are of specially tempered spring steel and the rollers of cold rolled steel and the pivots of bronze. With the exception of the pivots, the entire fixture is thoroughly electro galvanized. It is said that the cost of this device is from one-half to two-thirds of the ordinary double hung window equipment and that less than one-half the labor is required in applying. The weight and bulk and cost of handling and storage space is greatly reduced as compared with the ordinary equipment.

This fixture is said to entirely prevent rattling of the sash and it makes possible a plank frame construction and the ideal narrow mullion. By the use of plank frames the interior trim may be reduced to 2 inches by 2½ inches in width, which is desirable both architecturally and economically.

A mortise ⅞ inch wide, 1¼ inch deep and 4 inches long is cut in the sash, opposite the center or slightly above the center. The spring is set flush with the surface of the sash. If additional tension is required it is provided by slightly loosening the upper screw and elevating the lower screw, which is an adjusting screw, then again tightening the upper screw.

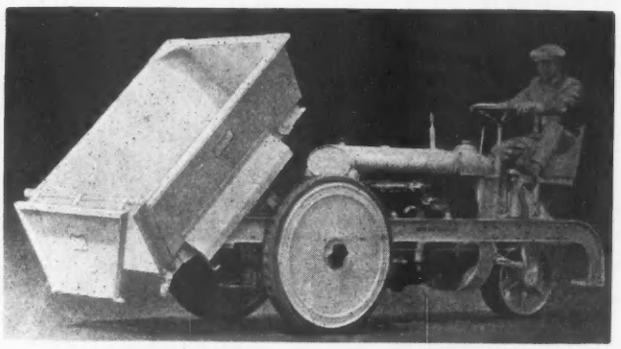


No Weights, Cords or Pulleys Are Required with This Sash Sustainer.

✣

Hopper Dump Body for Tractor

A RECENT adaptation of the Fordson tractor should prove of interest to many contractors for handling heavy bulk material, especially where it is necessary to operate over soft or rough ground. The drive of the regular tractor has been reversed so that it will run backwards and the driver's seat is placed at the new rear end, back of the radiator. The two small wheels, regularly used at this end, are replaced by one small wheel, centered. This gives



On Soft or Rough Ground This Hopper Dump Bod Mounted on a Fordson Will Be Found a Most Effectiv Piece of Equipment.

an extremely short turning radius and makes for easy handling under the most conditions.

At the other end of the frame, which is now the front end, a steel dump body, which has a capacity of one cubic yard, is mounted. This hopper body is mounted well forward and dumps forward, as shown in the illustration, so that it is possible to drive up close to the excavation which is to be filled and dump directly into the fill. The hopper is mounted in a balanced position so that it is only necessary to unhook it for dumping and the load is dropped in any desired spot by gravity.

✣

To Study Wood Preservation

GEORGE M. HUNT, head of the wood preservation section of the U. S. Forest Products Laboratory, sailed for England early in March to make a survey of Eureopean wood preserving methods and to collect European service records on chemically treated railroad ties, mine timbers, posts and poles. The trip, which will require about five months, is particularly for the purpose of discovering the merits of a number of wood preservatives recently developed in Europe, some of which are now being promoted in this country. Mr. Hunt will also investigate the methods used for impregnating wood with creosote, zinc chloride and other standard preservatives, and the progress of forest products research abroad and the Hetzer System, developed in Switzerland, for forming large timbers by gluing boards together.

✣

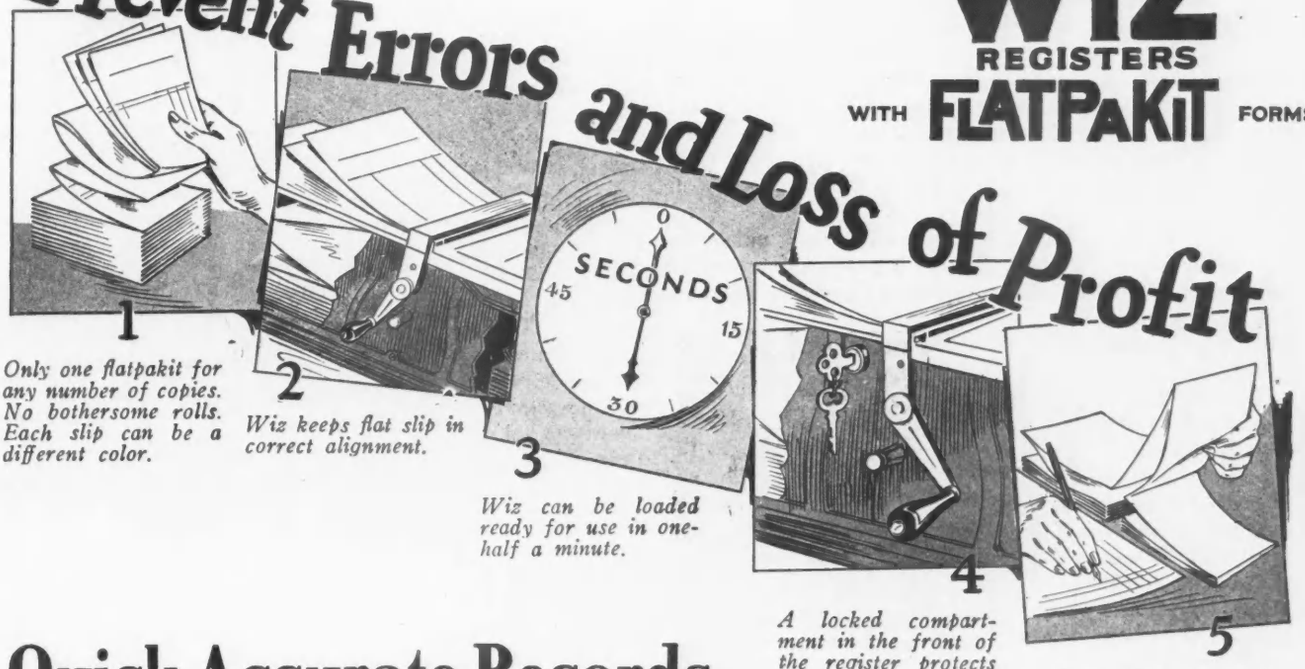
Establishing Closer Relations

REPRESENTING the Producers' Research Council and the Copper & Brass Research Association, John F. Cowen is at present making a tour of the United States addressing chapters of the American Institute of Architects and local bodies of the National Association of Sheet Metal Contractors. The purpose of this tour is to acquaint architects and sheet metal contractors with the aims and purposes of the movement to promote better relations between architects and manufacturers looking toward their mutual benefit.

(Department continued to page 658.)

Prevent Errors and Loss of Profit

★ WIZ REGISTERS WITH FLATPAKIT FORMS



1 *Only one flatpakit for any number of copies. No bothersome rolls. Each slip can be a different color.*

2 *Wiz keeps flat slip in correct alignment.*

3 *Wiz can be loaded ready for use in one-half a minute.*

4 *A locked compartment in the front of the register protects a complete record of every transaction ready for immediate reference.*

5 *A complete copy of every original automatically refolds in the front compartment in one unbroken strip—no lost slips. It is a perfect binderless file always in numerical order. It makes auditing easy as the slips are turned over like the pages of a book.*

Quick Accurate Records of Every Transaction

It is not necessary to point out the importance of keeping an accurate written record of every order, of every transaction. Every business man knows that unless this is done mistakes creep in. And mistakes invariably lead to lost customers and lost profits.

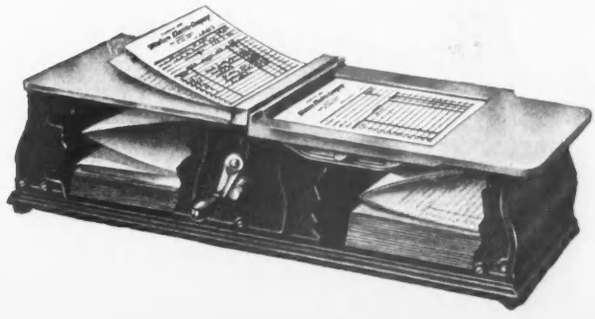
But not only must your system give you **accurate** records, but it must be simple and quick in operation. That is why so many concerns in every line of trade are turning to the Wiz Register with its "Flatpakit" forms.

To compare Wiz Register to any other autographic register is to compare the modern breech loading gun to the old time muzzle loader. Wiz uses only one "flatpakit," no matter how many copies are needed, instead of several rolls or packs for each copy. It can be loaded very quickly. Its slips always lie flat. Elsewhere on this page you will see the many advantages Wiz Register offers.

It will pay every business man to investigate Wiz Register further, for here is not only the very latest improvement in the autographic register field, but also one of the quickest and most accurate means of keeping your original entries correct. Write and let us tell you how Wiz Register can help you in your particular problems.

★ An Amsaboco Product

Wiz Register is only one of the many products made by American Sales Book Co., Ltd., the oldest and largest maker of original entry and profit saving systems. Our 42 years of experience and the biggest force of trained representatives is at your service.



Pin to Your Letterhead and Mail

American Sales Book Company, Limited
Dept. 224, Elmira, New York
Show me how Wiz Register can improve my present method of keeping records.

Name.....

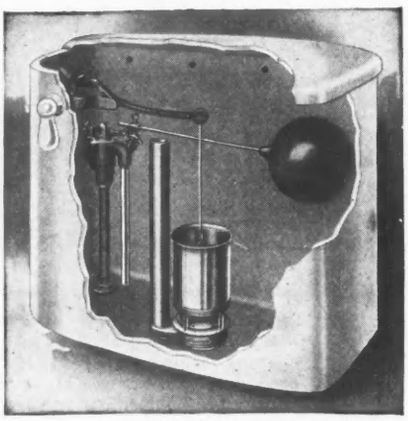
Street.....

City..... *State*.....

Silent Flush Tank Fittings

MANY times all or much of the profit on plumbing installation is lost through the necessity of making repairs and readjustments of leaky valves, faulty levers or noisy ball cocks. One line of flush tank fittings which is especially designed to avoid such conditions also provides for a thorough flush with only four gallons of water and without noise, and a quickly refilling of the tank. These fittings are suitable for use in any flush tank and do not require refill tubes, counter weights, trips, catches or other mechanical contrivances.

The valve has a full unrestricted water way and starts the siphon action immediately. It will, therefore, operate even the largest closet with a minimum of water. It takes out all the water and the tank refills with clean water only. A flat leather seat washer which will not leak is used and the valve is easily operated, a slight touch of the lever lifting the valve, which always finds its seat as there are no close fitting parts. This valve is made of cast copper and cast composition metal with no soldered parts and will last many years. The rotary ball cock is largely responsible for the silent operation which is obtained because of the revolving stream of water. On very low pressures the opening of a by-pass screw permits free passage of water through the ball cock and insures quick refilling of the tank.



Cut-Away View of a Tank Equipped with Fittings Especially Designed for Silent Operation and to Do Away with Repairs and Readjustments.

✣

Hand Forged Wrought Iron

THE vogue of Colonial, English and Spanish architeture has brought with it a demand for wrought iron, hand forged hardware which is being ably met with the same attention to detail and care that the craftsman of other days gave to his work. The modern pieces carry out the true spirit of the earl ydesigns to the most minute detail and include all items which were used in the houses of the earlier periods.

Some of these pieces are blind holdbacks, chimney ornaments, Colonial and English surface locks, door latches, strap and "H" and "L" hinges, center, top and bottom bolts, casement and cupboard fasts, lift latches, knockers, foot scrapers and weather vanes. In addition to the regular patterns which this company manufactures, it is prepared to offer suggestions for special designs or to quote on architects' designs and give the same perfection of work on such orders.

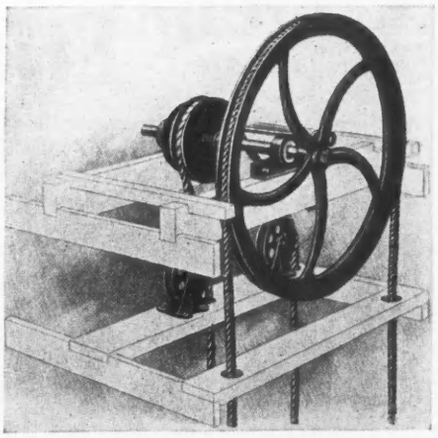
✣

Dumb Waiters for Apartments

AMONG a line of dumb waiters and hand elevators designed for all sorts of installations is the dumb waiter illustrated here. This is especially intended for use in apartments and is proving very popular for this purpose. It is absolutely self-retaining, holding either right or left without jar and runs perfectly, smoothly and noiselessly. The car, which is suspended from the elevating device, shown in the illustration, is lined throughout with galvanized iron having soldered joints and is also covered on top.

The guides are of seasoned, straight grain North Carolina pine and are grooved for the weights. The counterweight is of a flat sectional design adjustable to the weight of car and its load.

Each dumbwaiter comes equipped with the best quality Manila rope, joined by coupling, and cable of ½-inch diameter, standard, make, is used for hoisting. This dumbing. This dumbwaiter is complete, ready to be erected, with the aid of complete drawings of construction.



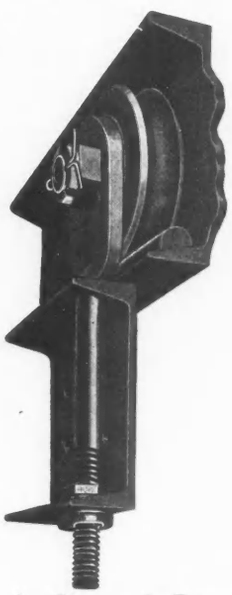
Here Is Shown the Elevating Mechanism of a Dumbwaiter Design for Apartment House Installations and Supplied Complete, Ready for Erection.

✣

Correct Door Hanging

THE selection of proper hangers and track for sliding doors of all sizes is really a problem in engineering because of the fact that the service which such equipment gives is dependent upon the amount of use to which it is put as much as upon the size and weight of the doors. Doors of similar size, weight and material often require different sizes of hangers and track.

A company specializing in the production of sliding door hardware has, through years of experience, developed equipment of superior quality and makes each installation a special job. Because of special care used in the manufacture of these hangers, friction is reduced to a minimum giving them a longer life and making the operation of the door easier. Doors weighing over 900 pounds, carried on these hangers, can be set in motion by a seven pound pull. Although the hanger is partly ball bearing in construction, the main bearing operates with considerably less friction than if operated on ball bearings. It is the action of this main bearing which allows such easy operation.



A Channel Beam Track for Hanging a Single Door Is Made in All Sizes of Channel.

The tracks used consist of either channel or "I" beams, with a half round on the bottom flange. These are supplied in all sizes in which these beams are made, from 2 to 15 inches for channel and from 3 to 15 inches for "I" beam. Since the wheel is of almost the same size, in diameter, as the distance between the flanges of the beam, it is impossible for the hanger to jump off the track after it is in place. Various combinations of channel and "I" beams permit of installations carrying any number of doors, one door to each bottom flange. A swivel hanger is adapted to use on doors which must turn a corner. The construction of this hanger is the same except that hanger is swiveled on a ball bearing pivot connection instead of having a rigid connection between the door and wheel.

(*Department continued to page 662.*)

You can prove this is the superior gypsum wallboard

WHERE wallboard finds practical use, Gypsolite will give the best possible results. Nailed in large boards directly to studding, or over damaged wallpaper, with joints smoothly filled, it makes a solid continuous wall of rock that cannot warp, shrink, nor crack, ready for decoration without loss of time for drying. Can be painted, papered, calcimined or paneled.



GYPSOLITE WALLBOARD is 6 ways better

1—Greater strength: Wide boards of gypsum rock, lined with a tough fibre material. Stronger by 25% than other gypsum wallboards.

2—Lighter weight: Full ⅜ inches thick, yet 20% lighter than other gypsum wallboards, in spite of its greater strength.

3—Less breakage: Stands rough treatment with less damage because of its greater strength and rigidity.

4—Better insulation: Pure gypsum, containing minute dead air cells, makes up the core of Gypsolite obstructing heat, cold and sound.

5—Saws more easily: Cuts as clean and true as pine. No crumbled edges.

6—Nails without breaking: May be nailed within ⅜" of the edge if necessary, without danger of splitting the core.

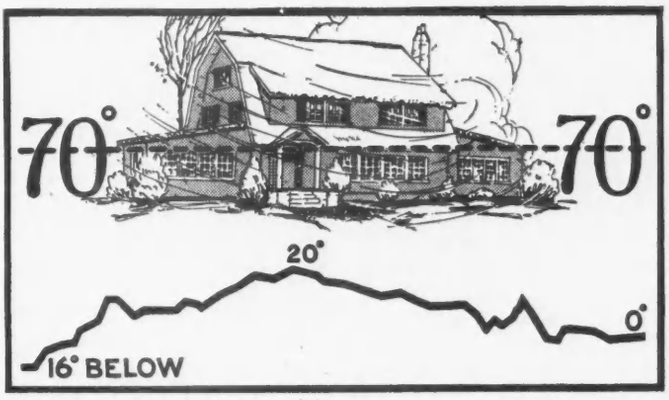
Gypsolite is fireproof. Its remarkable insulating properties reduce heating costs. As a sound deadener, it promotes privacy. Many homes in your community need remodeled attics, at little cost, to provide extra rooms, for children's playroom, den, or additional sleeping quarters.

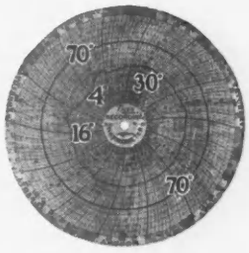
Stop heat leakage—save 50% in fuel cost

Stop heat losses through walls and roof, saving the cost of tons of coal per year, by using Insulex, the gypsum insulation that pours between studs, under floors and roof, filling every crevice, effectively sealing the house against avoidable heat losses.

Best insulation for money expended

Tests show that 3⅝ in. of Insulex in sidewalls, and 4 in. elsewhere, give from 1½ to 7 times more effective insulation than other insulating materials; and cost considered, from 2 to 4 times as much for the money expended. Data on request.





Outer line on this recording thermometer chart shows constant temperature downstairs, day and night, for the entire week ending Feb. 7. Inner line shows outside temperature varying from 16° to 4° to 30° above zero.

The Ashenhurst Insulexed house, Chicago, maintained this temperature with a small heating plant, operating on only half capacity. There were no drafts on the floor. Humidity was over 40%.

We welcome the most exhaustive investigation by builders, and will gladly explain the application of Insulex in detail, without obligation. Write for literature.

INSULEX GYPSUM INSULATION

PATENTED JUNE 12, 1917 AND NOV 25, 1924

UNIVERSAL GYPSUM COMPANY, *Chicago*

Dept. 12, 111 West Washington Street

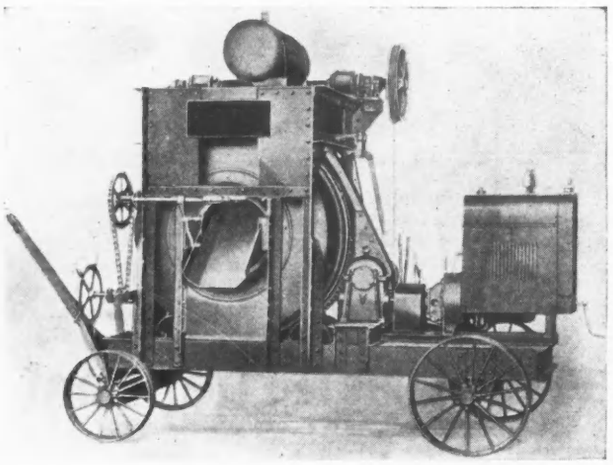
Gypsolite and Insulex may be shipped in straight or mixed cars, with plaster and other gypsum products, from our mills at Ft. Dodge, Ia., Akron, N. Y. and Rotan, Texas

What's New?

Mixer with Worm Reduction

A NEW development in concrete mixers has been announced by a well known company, the new mixer having the principal driving mechanism completely enclosed in an airtight housing, mounted on ball bearings and running in oil. This is accomplished by using a worm speed reduction instead of the usual gears and shafts or chains and sprockets to reduce the engine speed to the speed of the drum. Not only are fewer parts required but wear on the worm is said to be practically negligible and a freedom from noise and vibration, new to concrete mixers, made possible.

This worm reduction is a heat treated steel worm, direct connected through a universal coupling, to the engine shaft. It drives a bronze worm gear which is mounted on the drum pinion shaft. Through this one unit the speed of the engine crankshaft is reduced to the proper speed for the drum. Four big bearings are used in the worm reduction, two for the worm shaft and two for the worm gear shaft. The entire unit is mounted in a heavy housing and runs in oil.



A Worm Speed Reduction, in Place of the Usual Gears and Shafts or Chains and Sprockets, Is the Most Conspicuous Feature of This New Concrete Mixer.

From the standpoint of operation, the use of the worm reduction gives several new advantages. The radiator is faced directly away from the drum. The crank of the motor is hung over one end of the frame. All parts of the motor are easy to reach from either side. Changing from gas to electric motor can be made using the same drive shaft with a universal coupling bored to fit the shaft of the motor. As the power take-off is based on 1,200 R.P.M. for either gas or electric power, no change in the speed reduction is necessary.

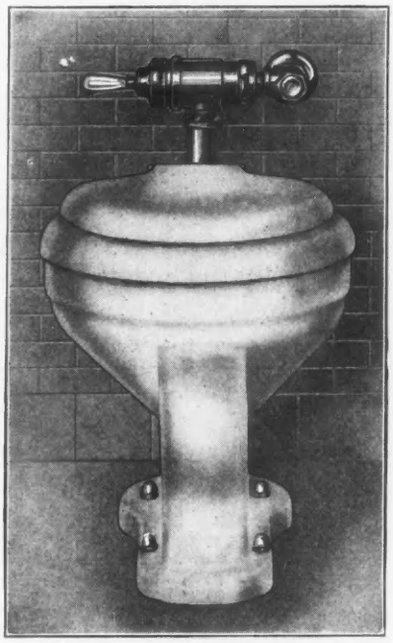
From the safety standpoint, the use of the worm reduction is a distinct improvement. The only gears required are the drum gear and its pinion. These are covered with a steel guard. The drive shaft from the motor to the worm is also covered as is the power loader hoisting mechanism.

✣

Wrought Brass Flush Valves

ONE of the large brass companies, which has manufactured brass pipe and plumbing goods for many years, has taken over from the original maker all rights on a flush valve. This valve, always of superior design, but formerly made from castings, is now entirely a wrought brass product. It is made in three models known as the push button type, the oscillating handle type and the floor valve, foot actuated type.

This valve is hydraulically controlled, containing no diaphragm, air or oil to be replaced. It operates satisfactorily on all pressures from 8 to 150 pounds per square inch and on varying pressures will deliver the exact quantity of water for which it is regulated. This regulation permits of adjustment for duration of flush without shutting off the water.



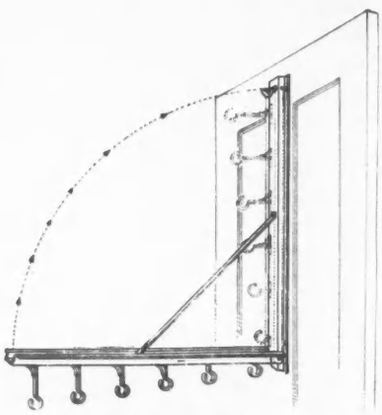
The Flush Valves Used in This Product Are of a Well Known Type, but Are Now Being Made Entirely of Wrought Brass.

This is a rugged valve and quiet in operation, it is practically indestructible, simply constructed and easy to install. It is not interfered with by water sediment, is free from water hammer and jar and can be installed in any position desired.

✣

Rack Increases Closet Capacity

VERY few housekeepers ever have as much closet space as they really want but it is impossible to build more closets into the house or enlarge the ones already built. It is possible, on the other hand, to increase the capacity of the closets by the installation of neat folding clothes racks. Two or three of these racks, placed on closet doors, are the equal to an extra closet in the house and they give assurance that the closets will always be kept neat and the clothes unmussed.



Designed for Installing on Closet Doors, This Rack Will Increase the Closet Capacity and Prevent the Mussing of Clothes.

These racks are sturdily built of black enameled steel. They are 26 inches long and 3 inches wide and weigh three pounds. They can be quickly and easily put up by anyone who can use an ordinary screw-driver. When folded up out of the way, the rack fits closely against the door and is held in place by a strong clasp at the top. Six substantial hooks extend down its length and each extends out a little farther than the one beneath it so that garments can be hung without being mussed. When unfolded the arm drops to a horizontal position, as it appears in the illustration, placing the clothes at a convenient height to be reached.

✣

The Koehring Company, Dept. D1, Milwaukee, Wis., has just published a new catalog of its 7S Dandie Mixer which is fully illustrated and described.

(Department continued to page 666.)



Built for a Long Life of Heating Efficiency!

***THE THATCHER ROUND BOILER** Steam or Hot Water. Staggered fire travel puts smoke and gas to work. Automatic regulation, comfortable heat at all times. Economical on fuel. Long period between firing. Sizes and capacities for individual requirements. Ask for your copy of illustrated catalog describing, in detail, the many superior features of the Thatcher Round Boiler.*

WHEN you recommend the Thatcher Round Boiler you assure the house-owner heating comfort for many years to come. And this heating comfort is secured with the very smallest consumption of fuel and with the least trouble and bother!

The efficiency of the Thatcher Round Boiler is due, primarily, to its superior equalization of grate surface and flue area and the rapid circulation of the water—features which make every pound of coal do its full duty and assure ample, uniform, healthful warmth on the very coldest days.

THE THATCHER COMPANY

21 W. 44th St.
NEW YORK

Formerly Thatcher Furnace Co.
Since 1850
39-41 St. Francis St., Newark, N. J.

341 N. Clark St.
CHICAGO

THATCHER

BOILERS · FURNACES · RANGES

News of the Field

A Recognition of Service

AT a meeting of the Bridgeport Brass Company, held Tuesday afternoon, February 23, Warren D. Blatz, general sales manager, and Walter R. Clark, general works manager, were appointed to the board of directors. The selection of the two men as directors is in public recognition of their ability and rapid rise in the ranks of chief executives of the firm.

Mr. Blatz joined the organization of the Bridgeport Brass Company in 1916. His work has always been in the sales department, starting first in the manufacturing end and then specializing in phone-electric. He has worked on practically every desk job in the sales department and five years ago was made sales manager of the mill products division. About three years ago he was made general sales manager.

Walter R. Clark was graduated from Yale (Sheffield School), class of '99. In 1900 he started in as a draftsman in the Bridgeport Brass Company. He soon rose to be head draftsman and later was made chief engineer, which position he held until 1919 when the duties of works manager in the mill products division were added to his other duties. During this period the company expanded from its small size to its present place in the industry. Under his supervision the Housatonic plant was built. In 1921 he was made general works manager in charge of both divisions, which position he holds today.

✣

Lumber Meetings in April

ANNOUNCEMENT was made here today that the twenty-fourth annual meeting of the National Lumber Manufacturers' Asscіation would be held Thursday and Friday, April 22-23, at the Congress Hotel, Chicago.

The morning of April 22 will be devoted to committee meetings, with a general program of addresses in the afternoon, and an annual dinner in the evening. The second day, April 23, will be devoted entirely to the business of the association including brief stockholders' and directors' meetings. Wednesday, April 21, should be kept open for a meeting of the National Lumber Trade Extension Committee.

✣

Koehring Is Honored

ANNOUNCEMENT has just been made of the election of P. A. Koehring as president of the Milwaukee Association of Commerce. Mr. Koehring is known to the building industry as general manager and secretary-treasurer of the Koehring Company, Milwaukee, manufacturers of pavers, mixers, gasoline cranes and similar equipment.

✣

"American Home" Is Awarded

THE American Home which was sent to France for the International Exhibition of Household Appliances and Labor Saving Devices, has been awarded, by a special committee of prominent French citizens and government officials, to La Bienvenue Francaise, the "association for the promotion of intellectual and moral intercourse between nations" of which Marshall Foch is presiding officer.

This society, which was selected from among 35 organizations and individuals, is officially recognized as the organization which welcomes distinguished visitors to France. Distinguished representatives of the arts and sciences, industry and public affairs who come to France from all parts of the world will hereafter be formally welcomed in the American Home and in many cases will be invited to make their residence in the American Home during their stay in Paris.

During the International Exhibition approximately 1,000,000 persons have inspected this home.

Celebrate 140th Anniversary

THE printed annual report for the year ending December 31,1925, of the General Society of Mechanics and Tradesmen of the City of New York, is noteworthy in recording the 140th anniversary of this organization. The Society, founded in 1785, is one of the oldest in New York City, being antedated only by the Chamber of Commerce. It is, in fact, a continuation, in modified form, of the kind of institutions that grew up in England with the development of the mechanical arts and were known by the general name of "Guilds."

The report recounts a portion of the history of this society which played an influential part in the formative period of the history of the country. It was first established to provide aid for worthy artisan and their dependents in case of death or misfortune. In the years that have followed its scope has broadened until today its activities include pensions, free night schools, trade scholarships, libraries, lectures and a museum.

✣

New Architectural Bureau Head

THE paint department of E. I. du Pont de Nemours & Company has announced the appointment of Frank T. Stocker as manager in charge of its architectural bureau. Mr. Stocker has long been active in the paint industry and has a wide acquaintance throughout the country with paint men. For fourteen years he was associated in the brush business and during the past twelve years has been sales manager for the Standard Varnish Works. Mr. Stocker has always been active in the paint and varnish organizations and has also been closely associated with master painter groups.

✣

Crooks-Dittmar Plant Completed

A NEW factory, which represents the most advanced type of woodworking mill, has just been completed for the Crooks-Dittmar Company at Williamsport, Pa., at an approximate cost of $400,000. This mill is built on an 11½-acre tract and has been designed and erected by the H. K. Ferguson Company, engineers and builders of Cleveland and New York. It will more than double the floor space and the output of the present factory of the company.

✣

Foreman Made General Manager

THE Martin-Senour Company, 2520 Quarry Street, Chicago, has recently made E. H. Foreman general manager with supervision over all its branches throughout the United States. Mr. Foreman, who has been holding the position of manager of sales and production, has been with the company for some 20 years and, serving it in all departments, has added substantially to its rapid growth as well as becoming familiar with every phase of the production and sale of paints and varnishes.

✣

Holds First Safety Meeting

ON March 16, the first of a series of monthly meetings was held by the New York Building Congress to further the work of accident prevention among employers and employees in the building industry. The meeting was attended by over 300 employers, engineers, architects, superintendents, timekeepers and labor representatives and gives promise of much progress in advancing this important cause.

DEMANDED—*as a matter of course*—in Today's Homes

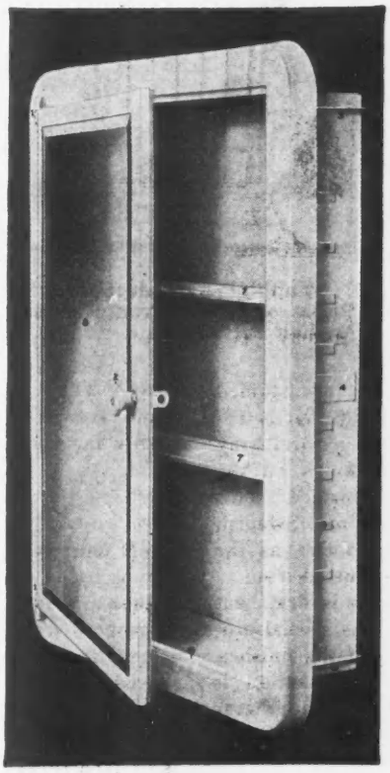
Standard Types and Styles
"White-Steel" Medicine Cabinets are built in three standard types: Inset (to recess), Wall (to attach to face of wall), and Corner (to fit in corner). Made in styles and sizes to meet every architectural requirement.

Seamless Construction
"White-Steel" Cabinets are die cast; they have no seams. Joints are electrically welded throughout. Structurally the finest of cabinets.

Correctly Gauged
Each part of "White-Steel" Cabinets is made from metal specifically gauged for its particular function. In this way light and heavy thicknesses are scientifically utilized. A correct structure results.

Best Materials Used
Because we insist upon "White-Steel" Cabinets being the absolute finest, we use the very best of materials. Skimping in the hidden parts is never permitted.

WHITE-STEEL



Patented Pivot Hinge
The exclusive lock pivot hinge is adjustable so that the door can always be properly centered. Does away with the unsightly hinges and screws.

Ceramic Knob
The demountable white ceramic knob perfectly matches the whiteness of good plumbing fixtures. Just another detail in completing the beauty of "White-Steel" Cabinets.

Heavily Reinforced
Attention is paid to points of anchorage to insure positive rigidity.

Spot-Welded Supports
No floating shelf supports; they are spot-welded and cannot become loose.

Ventilation
Step-in door and jamb provides sufficient, and invisible, ventilation. An important factor.

Plate Glass Shelves
Polished plate glass, smooth-edged, is used for shelves. It is ¼-inch thick.

Demountable Mirror
This feature permits easy installation in case mirror is accidentally damaged.

WHITE-STEEL

There's Only One Best—*Be Sure You Get It*

The day of convincing people that steel medicine cabinets are standard fixtures in up-to-date homes has long since passed. They are accepted as a matter of course. Even the problem of selecting the cabinet of highest quality has been settled, for when it's a question of having the best the choice is the "White-Steel" Cabinet. In outward appearance alone the "White-Steel" Cabinet stands forth as the most beautiful—the ultra fine medicine cabinet. But there's more than skin deep beauty in the "White-Steel" Cabinet; its quality goes clear through. And it's under the enamel that you want your quality because it is the base that determines the life of the cabinet.

The Desired Finishing Touch

Installing a "White-Steel" Cabinet in the bathroom, kitchen and lavatory is the finishing touch to these rooms. "White-Steel" Cabinets help sell homes because they are refinements which go such a long way in making a home attractive and thoroughly livable. And it is all accomplished at so little cost that it is no wonder the modern builder never thinks of omitting them.

HENZIN METAL

The base of all "White-Steel" Cabinets is the product of a secret process which cannot be duplicated or successfully imitated. Henzin Metal is rust-resisting. It has great adhesive qualities. On it are applied six coats of "White-Steel" enamel, each coat baked on separately. The result is a permanent finish of deep, pure white, forever beautiful.

RUST RESISTING

It's Up to the Contractor

Recommending and installing "White-Steel" Cabinets is up to the builder. He is the logical man to handle this detail. That's why contractors everywhere are including "White-Steel" Cabinets in their plans and specifications—for the bathroom, kitchen and lavatory—and finding it profitable to do so. The possibilities open to the contractor and home builder are made apparent in our illustrated catalog. Send for your copy NOW. Remember that you are not getting the best unless they are "White-Steel" Cabinets.

Get Your Catalog From **"White-Steel" Sanitary Furniture Co.**

55 Mt. Vernon, Grand Rapids, Michigan

Craftsmanship in Forged Iron

DURING the medieval years of the tenth to seventeenth centuries and our own Colonial period some of the finest examples of forged iron hardware were produced. For those who seek the charm of artistic craftsmanship, faithful reproductions of these famous designs are now available. In such pieces as hinge straps, H and L hinge plates, drop ring and lever handles, entrance knockers, shutter dogs, and casement sash fasteners every detail of subtle curve and artistic form are authentic.

In producing this hardware mechanical accuracy, which is even more essential today than ever before, has been insisted upon to provide for the successful application of these earlier forms of hardware to modern building.

This forged hardware is furnished regularly in three distinct finishes. The dead black possesses that dull black appearance with which earlier craftsmen were accustomed to finish their work. The relieved iron finish perfectly resembles those pieces of old iron in which the natural gray color of the iron shows through the black finish on the slightly raised portions of the uneven metal surface. This finish is also referred to as gray iron, Flemish iron, Swedish iron and half-polished iron. The rusty iron finish, as the name implies, has the reddish-brown cast of rusted iron.

Before receiving the final finish every piece is first heat treated with zinc in order to prevent rust. This special protective coat adds greatly to the permanence of the finishes. In addition to this rust-proofing, particular attention is given to providing a final finish that will withstand wear and exposure.





Faithful Reproductions of Early Craftsmanship Are Seen in These Pieces of Forged Iron Hardware Which Add the Finishing Touch to the Modern Period Home.

✣

Tapered Asbestos Shingles

BEAUTY is added to utility in a new kind of asbestos shingle, tapered in thickness, now being placed on the market by a company which for 20 years has manufactured indestructible, unburnable shingles of asbestos and cement.

Half an inch thick at the butts, these shingles cast shadows that break the monotony of an expanse of roof. The English thatch, or rough type, in random widths, makes an artistic roof. The smooth, or Colonial type, also can be supplied in random widths, and the butts can be broken, if desired. Both types are made in various colors, making possible innumerable combinations of color and tapestry effects and giving the architect a new medium of expression in the treatment of roofs.

These shingles cannot burn and are not affected by exposure to the elements. Because of their elasticity, frost and ice cannot split them. They never curl and cannot decay. They will wear for the life of the building. The colors are mineral colors that never fade and are thoroughly incorporated in the body of the shingle.

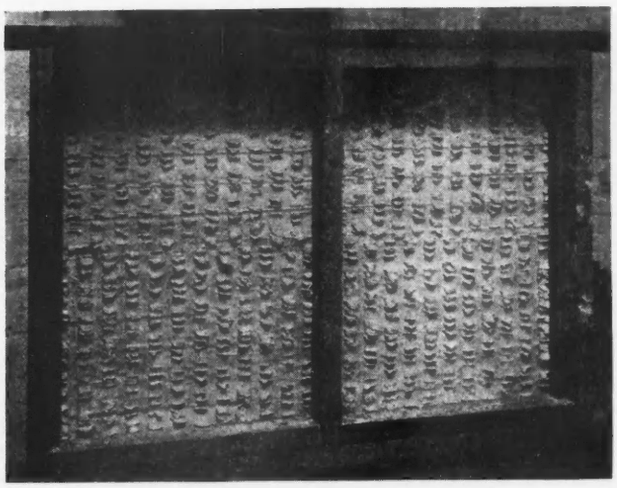


The English Thatch Style of Roofing in This New Type of Asbestos, Tapered Shingle Can Be Obtained in Permanent Colors.

✣

Something New in Lath

AN entirely new type of lath for both plaster and stucco is based on an idea brought from Europe and used in France and Italy for the construction of walls intended for adornment with paintings. This lath is in the nature of a cement sheet product and is made by enveloping steel ribs, spaced 2¾ inches apart, between two sheets of heavy paper. A special tough cement is used to form the adhesion between the sheets of paper and the blank so formed is perforated to form keys for the plaster.



As the New Type of Lath Appears from Behind, Showing the Keying of the Plaster Through the Perforations.

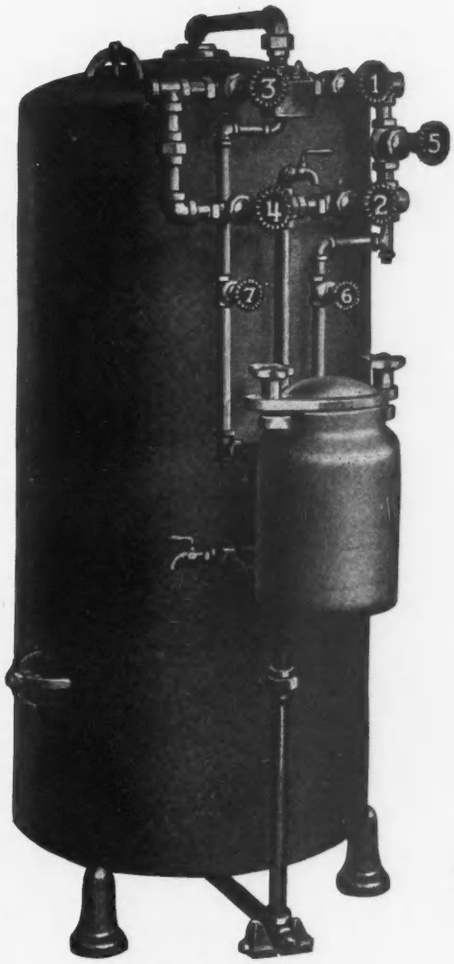
Next the blank is treated by immersion in a chemical solution which fills the pores of the paper. After this treatment it is submerged in another cementious solution which combines with the first fluid to form an insoluble silicate. This largely destroys the identity of the paper structure leaving a tough, slightly flexible sheet, having the characteristics of cement.

According to the manufacturers plaster is easily and quickly applied to this even surface, with uniform plaster keys, without waste, the metal ribs form a positive reinforcement to the wall body and the material is incombustible.

(*Department continued to page 754.*)

Soft Water

—*in the home*



Graver Model "D"

The convenience, the economy, the labor saving of soft water is of course best known to those who have used soft water. The chapped skin, laborious cleaning, stiff, muddy colored, short wearing clothes and linens are many times accepted as a matter of course to the hard water user.

Rain water is soft, but it is not dependable, and furthermore it is smelly and very seldom clean. A cistern and dual piping in the home costs considerable.

You can obtain soft water from your hard water supply with the Graver Water Softener. It will give you all the water you want, clean, "drinkable," and softer than rain. A Graver Softener can be installed in your new home at a much lower cost than a cistern and double piping system.

It is economical and easy to use. The entire cost is a few pounds of salt (which imparts no taste to the water) each week or so, and the operation consists in simply turning a few easily reached valves.

The Graver Softener is built on the same principle as the large industrial softeners installed by Graver throughout the country. Graver Corporation has been manufacturing since 1857, and stands back of every softener leaving its plant. You assume no risk as you buy from an established concern with a proven product.

See your dealer or write for complete information to Dept. W. S.

Dealers and Distributors

We have several territories still open for the sale of our household softener. In writing for plans tell us of your organization and territory covered.

GRAVER *Founded 1857 Corporation*

EAST CHICAGO, INDIANA

1100-1200 Todd Street

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to readers of the American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

"Fresh Air and Ventilation," by C. E. A. Winslow, published by E. P. Dutton & Co., 681 Fifth Ave., New York City, is an interesting and valuable treatise of this subject for the general, non-technical reader and contains information which will prove surprising to those who are not in touch with the most recent investigations of the subject. Price $2.

"Penrhyn Stone" is an attractively illustrated pamphlet, prepared by the J. W. Williams Slate Co., 103 Park Ave., New York City, covering the various uses of its slate floors, walks, roofs, steps, coping, wainscoting, base and terraces and is accompanied by a separate price list.

The William Bayley Company, 128 North St., Springfield, Ohio, has a new catalog of its steel windows, marked for filing under the A. I. A. system and completely illustrated with photographs and drawings.

The "Auer Register Book" is the new catalog of The Auer Register Company, 3608 Payne Avenue, Cleveland, Ohio, and covers the various types of registers, grilles and radiator covers manufactured by this company.

"The Secret of Home Comfort," a booklet published by the American Radiator Company, Dept. 125, 1807 Elmwood Avenue, Buffalo, N. Y., tells the story of the Ideal Vecto heater for cellarless houses.

"How About Your Roof" and "Mecco Fireproof Windows" are catalogs of the Moeschl-Edwards Corrugating Company, Covington, Ky., covering its line of sheet metal roofing material and tile and its sheet metal window sash and frames.

"Thatcher Installations" is the title of a book prepared by The Thatcher Company, 39-41 St. Francis Street, Newark, N. J., and containing a series of photographs of various buildings and residences in which Thatcher furnaces have been used.

The Massillon Steel Joist Company, Canton Ohio, has four new pamphlets, under the titles, Massillon Metal Lath, Massillon Roof Truss, Massillon Bank Vault Reinforcing and What the Building Industry Thinks About Fireproof Floor Construction with Massillon Bar Joists, and also a revised edition of its Safe Loading Tables and Standard Specifications.

The Borden Company, Warren, Ohio, has issued a pamphlet on the turning of waste time into profits by the use of its No. 44 Beaver power drive.

The Duro Pump & Manufacturing Company, 103 Monument Avenue, Dayton, Ohio, presents a new folder, No. 66, which contains a chart describing the five basic advantages of the Duro water softener.

Frank B. Hall, Geneva, Ohio, offers a small pamphlet descriptive of the Hall octagon line and surface level.

"Hisey Portable Electric Tools" are fully described in a new catalog, No. 32, published by The Hisey-Wolf Machine Company, Cincinnati, Ohio.

"Home Water Service" is the title of a booklet published by Fairbanks Morse & Company, Chicago, explaining methods for providing water under pressure in homes where water is not obtainable from a central water works.

The Weatherbest Stained Shingle Company, Inc., 112 Main Street, North Towanda, N. Y., has published a folder containing a series of color photogravures of homes walled and roofed with its stained shingles.

TURN SPARE TIME INTO PROFIT



Plain Colonial Pattern
6½′ x 19″ x 13″

There is a ready market for hand made GRANDFATHER CLOCKS, and with our instructions, plans and specifications the job becomes a pleasure as well as a profitable one for energetic builders who take advantage of slack times by having a side line. The beauty of these clocks add an air of refinement and dignity to any home. You will want to build one for your own home as well as sell them to others. We will furnish clock works as low as $5.00 and up to $250.00. The higher priced movements include Westminster and Whittington chimes that play every quarter hour. A wide variety oi dials and movements can be had.

Get our catalog of dials, works, prices and instructions.

AMERICAN CHIME CLOCK COMPANY
1659-1669 Ruffner St., Philadelphia, Pa.



Style No. 94
7½′ x 25″ x 14½″
Beautiful Colonial Pattern



Style No. 92
7′ x 22″ x 13″
Doric Chippendale Pattern

American Chime Clock Co.,
1659-1669 Ruffner St., Philadelphia, Pa.

Gentlemen: Please send me your fully illustrated catalogue and free instructions for building a Grandfather's Clock.

Name.....

Street.....

Town..... State.....

You Must See NU-TILE

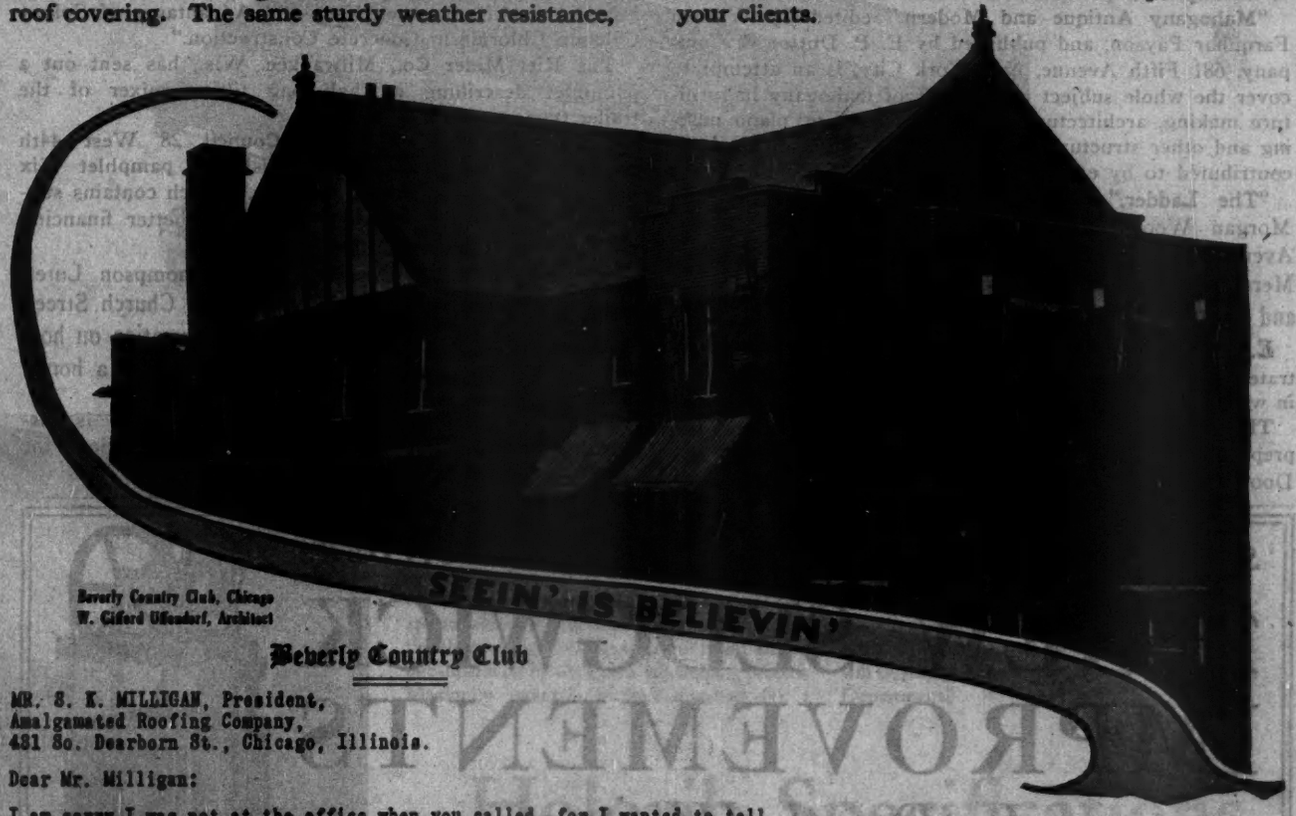
Tapestry Asphalt Shingle

WORDS cannot describe nor brush paint the beauty of **Nu-Tile** Tapestry Shingles—*you must see them*—to appreciate the unobtrusive harmony of nature's own permanent colors, as they are blended in the six major **Nu-Tile** tints. These again are laid on the roof in innumerable artistic combinations, enhancing the attractiveness of any house.

But **Nu-Tile** Shingles are more than a beautiful roof covering. The same sturdy weather resistance, which has been built into Amalgamated roofing products for so many years, is contained in **Nu-Tile** Tapestry Shingles. And in nature's non-fading minerals, marble, granite, slate and porcelain, lies the secret of the permanency of **Nu-Tile** tints.

Not until you examine actual samples of **Nu-Tile** Shingles can you get an adequate conception of their unusual roofing values.

You should have a set of **Nu-Tile** Samples to show your clients.



Beverly Country Club, Chicago
W. Clifford Ufendorf, Architect

Beverly Country Club

MR. S. K. MILLIGAN, President,
Amalgamated Roofing Company,
431 So. Dearborn St., Chicago, Illinois.

Dear Mr. Milligan:

I am sorry I was not at the office when you called, for I wanted to tell you of the many interesting and amusing comments of members of the club since we laid our new roof of Nu-Tile Tapestry Shingles.

Several inquired whether a less costly roof would not have served as well—they reasoned it must have cost considerable.

The general comments are, however--it almost makes the club look like another building. I NEVER REALIZED A NEW ROOF COULD SO IMPROVE THE APPEARANCE OF A BUILDING. The club appearance is 100 per cent improved by the new roof.

I, personally am highly pleased with the job. The weight of your Nu-Tile Shingles and their apparent wearing qualities, it seems to me, insures us against the expense of re-roofing the club for years to come.

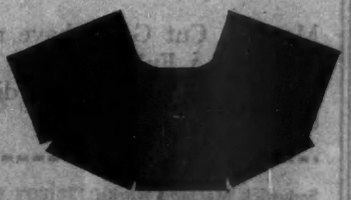
Sincerely yours,
(Signed) C. R. WALGREEN,
President (1924)

CRW'FL

THESE SAMPLES OF

NU-TILE

Tapestry Shingles are for you



WRITE FOR THEM TODAY

Nu-Tile Tapestry Shingles are manufactured by

THE AMALGAMATED ROOFING COMPANY
431 S. DEARBORN ST. CHICAGO, ILLINOIS

THE AMALGAMATED ROOFING CO. COUPON
431 South Dearborn Street, Chicago.
Please send me full details and a complete set of Nu-Tile Tapestry Shingle samples.

Name.....

Firm.....

Address.....

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to the readers of American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

"A Handbook on Gas Ranges for Architects and Builders" was listed last month as published by The Richardson-Briggs Company, Cleveland Ohio. This was an error. This handbook was compiled by the company named for its client, The American Stove Company, 233 Chouteau Avenue, St. Louis, Mo., manufacturers of the ranges described.

The American Saw Mill Machinery Company, Hackettstown, N. J., has published a new catalog, No. 25, of its complete line of saw mill and woodworking machinery. It is fully descriptive and illustrated.

"Mahogany Antique and Modern," edited by William Farquhar Payson, and published by E. P. Dutton & Company, 681 Fifth Avenue, New York City, is an attempt to cover the whole subject of the uses of mahogany in furniture making, architecture, marine architecture, piano making and other structural and decorative fields and has been contributed to by experts in each field. Price, $15.

"The Ladder," the new monthly publication of the Morgan Woodworking Organization, 2287 Blue Island Avenue, Chicago, has adopted as its platform, "Better Merchandising—More Productive Publicity in the Lumber and Millwork Field."

E. M. Long & Sons, Cadiz, Ohio, has published an illustrated booklet under the title, "Improved O. G. Fir Gutters," in which it tells the advantages in the use of its product.

The Wheeler, Osgood Company, Tacoma, Wash., has prepared a large book, "Telling the World About Laminex Doors in 1926," which tells the story of its national advertising plans for the coming year with reproductions of advertisements and the covers of the mediums used.

"Investigation of Business Problems," by J. Eigelberner, published by A. W. Shaw Company, Chicago, is a study of technique and procedure based on the author's experience in breaking in new research men and in practical work under all sorts of circumstances and conditions in various types of industrial establishments. Price, $5.

"Standard Concrete Mixers" is the title of a booklet cataloging the machinery manufactured by the Standard Scale & Supply Corporation, Pittsburgh, Pa.

The New Jersey Zinc Company, 160 Front Street, New York City, has published a research bulletin under the title "Metallic Zinc Powder as a Paint Pigment." Its purpose is to present practical information and formulas for the making up of paints.

The Solvay Process Company, Syracuse, N. Y., has issued a booklet on the "Uses and Advantages of Solvay Calcium Chloride in Concrete Construction."

The Kiel Mixer Co., Milwaukee, Wis., has sent out a pamphlet describing its half bag tilting mixer of the trailer type.

The American Construction Council, 28 West 44th Street, New York City, has published a pamphlet "Six Steps in Building or Buying a Home," which contains suggestions to prospective home owners on better financing and better building of homes.

"A Home of Your Own," by Della Thompson Lutes, published by W. T. Hunt & Company, 50 Church Street, New York City, is a new book full of information on how to choose, settle and manage a house and make a home. Price $3.50.

The Grasselli Chemical Co., Cleveland, Ohio, is distributing a booklet on "Grasselli R-B Silicate of Soda for Curing and Hardening Concrete Roads."

SEDGWICK OUTFITS FOR PERMANENT BUILDERS

2 NEW SEDGWICK IMPROVEMENTS

In Dumb Waiters

We announce an important advance in vertical transportation equipment through the perfecting of Sedgwick Type "FDCG" Geared Automatic Brake Dumb Waiter.

Machine Cut Gears have replaced cast gears and a Full Diameter Hoist Wheel permits the cable to drop direct to both car and counterweight.

These two new improvements, exclusive with Sedgwick, make Type "FDCG" easier to operate and double the life of the car cable. Moreover, it is **easier to install,** thus saving time and labor, because the number of parts is reduced.

There are five standard sizes, from 20"x16" to 36"x36", carried in stock at our factory. Special sizes furnished in four days

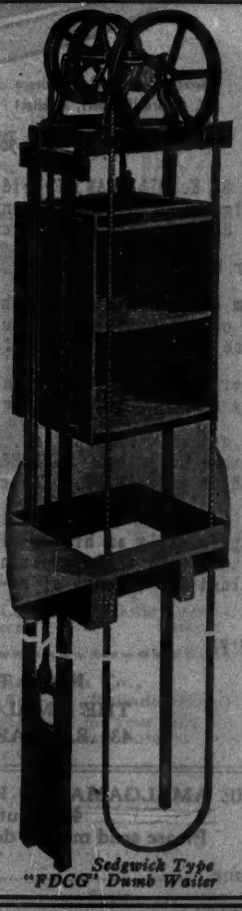
Special Service for Contractors
Includes Blueprints, Illustrations and Specifications.

Sedgwick Machine Works,
154 West 15th Street, New York.
Please send full information on Dumb Waiters, Freight Elevators, Trunk Lifts, Invalid Elevators, Sidewalk Elevators and Gravity Drops.

Name.....

Address.....

SEDGWICK MACHINE WORKS
154 West 15th Street New York



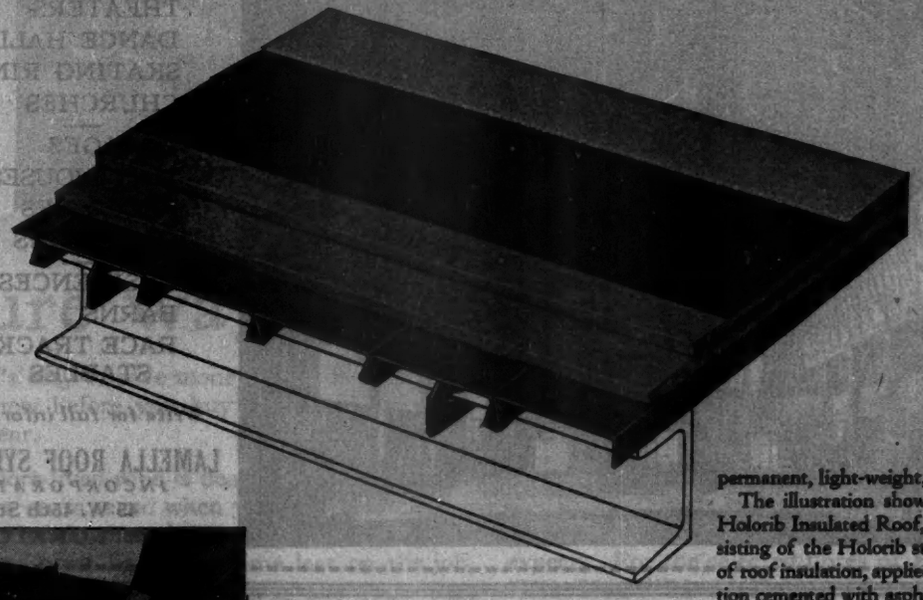
Sedgwick Type "FDCG" Dumb Waiter

HOLORIB

PATENTED FEB. 23, 1926

TRADE MARK

INSULATED ROOFS



permanent, light-weight, fire resisting roof deck.

The illustration shows a small section of a Holorib Insulated Roof, the complete unit consisting of the Holorib steel roof deck, two plies of roof insulation, applied broken joint construction cemented with asphalt, and a mineral surfaced waterproofing. Note the special Holorib clips for fastening deck to channel purlins. There is a Holorib clip for every form of purlin, especially designed to securely and permanently lock Holorib to the structural steel. Holorib sheets come cut in various lengths to fit structural designs. A complete roof lay-out for any building will be made, without cost, by our Engineering Department.

Holorib design is scientifically correct

Closed triangular ribs uniformly distribute roof loads at bearing points approximately 3" apart, each rib acting as a complete girder beam. There are no reinforcing accessories used to accomplish the above design, the construction being carried out inherently by one automatic shaping process. Maximum strength is thus obtained for a



View of Holorib roof deck—upper surface—showing end and side lap—also clip fastening points on a steel channel

The ribs of each Holorib sheet are crimped at one end, these crimped ends fit snugly into ribs of sheet previously applied. The side lap is provided for by a turned flange on one side of each sheet which fits into rib of adjoining sheet running its complete length.

Holorib Specifications

1—The Holorib sheets shall be manufactured from 22, 24 or 26 gauge copper bearing steel, black, galvanized or leadclad, by Holorib, Inc., Cleveland, Ohio. The material shall be rolled at the factory and all copper bearing or black sheets shall be given one shop coat of good quality paint.

2—Fastening Clips. The Holorib sheets shall be secured to roof purlins by means of specially designed clips, manufactured by Holorib, Inc., Cleveland, Ohio.

3—The Insulation shall be of the pressure resisting type, approximately 1" thick and preferably of half inch sheets; applied broken joint construction cemented solid with a high grade asphalt.

4—The Waterproofing shall be of the built-up bituminous type, the materials and workmanship to be first class in every respect, the surface finish to be either slag, gravel, or asbestos

Write for full information

HOLORIB, Inc.

2735 Prospect Avenue
CLEVELAND, OHIO

LAMELLA ROOFS

Construction protected by basic patents

See editorial pages 400 and 402



Ingenious Network covering spans up to 150 feet

for

THEATERS
DANCE HALLS
SKATING RINKS
CHURCHES

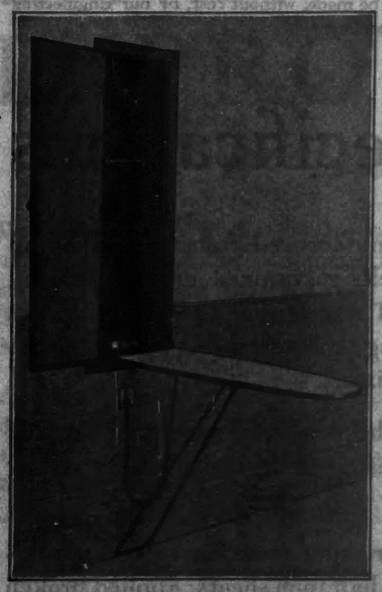
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CAR BARNS

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BARNS
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Write for full information

LAMELLA ROOF SYNDICATE
INCORPORATED
45 W. 45th St.
NEW YORK CITY

LIMACO LIMACO







The finishing touches

to any home or apartment are LIMACO products. The ironing board and cabinet, medicine cabinet and kitchen cabinet are built of all steel welded together. They are rigid, strong and fireproof, and fit between standard studding, thus saving a great deal on installation.

Our medicine cabinet like all Limaco cabinets fits in the wall between standard studding. It is fitted with a high-grade plate glass mirror 11" x 16" and plate glass shelves.

We will gladly send you complete information and quote you prices on any of these cabinets in any quantity. Just send us your address and say you saw our advertisement in April American Builder.

Limaco All Steel Ironing Board and cabinet requires only eight woodscrews and a few minutes to install.

Something new in Kitchen Cabinets. Ideal for kitchens where space is at a premium.

LIMA SHEET METAL PRODUCTS COMPANY
LIMA OHIO





Two ropes bought at the same time, used just alike. One is ruined; the other—H. & A. "Blue Heart" Manila—is still strong. It pays to buy really good rope

A sure way to save money on rope

It's easy to save money on rope when you know before you buy how the rope will wear.

Short-lived rope is dear at any price. The few cents saved when you buy do not count for much when the rope is soon worn out. You must figure the time lost on the job, and the cost of replacing the rope that failed.

Really *good* rope, on the other hand, saves you money every time in long, dependable service. And you can measure the wear in a rope when you buy. Not from outward appearance, for ordinary rope may look and feel better than it is. Here is the way to be sure.

Untwist the strands. If you find a thin blue thread marker—the "Blue Heart"—running in the center between the strands, then you may be sure of these facts.

What the "Blue Heart" signifies

The "Blue Heart" marker means that the rope is genuine H. & A. "Blue Heart" Manila Rope spun from high grade, pure selected manila fibre by rope makers with over half a century's accumulated experience.

It means also that in any size, on any job, the rope will wear longer and deliver without fail the strength you have a right to expect. For the selected fibres of H. & A. "Blue Heart" Manila Rope are drawn, spun, laid and properly lubricated so as to insure the smooth working of every fibre, yarn and strand.

Buy rope scientifically. Know beforehand what you are getting Untwist the strands and look for the "Blue Heart"—our registered trade mark that assures you dependable rope value.

Guarantee

H. & A. "Blue Heart" Manila Rope is guaranteed to equal in yardage and tensile strength the specifications of the U. S. Government Bureau of Standards.

Whatever may be your use for rope you will find an H. & A. brand of cordage to meet your requirements. Write us for complete information.

THE HOOVEN & ALLISON COMPANY

"Spinners of fine cordage since 1869"

Xenia, O.

H&A

H&A "Blue Heart" Manila Rope

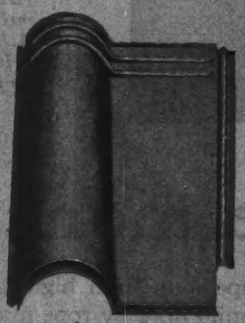
Trade Mark Reg. U. S. Pat. Office

MOESCHL-EDWARDS
Sheet Metal Building Material

SHINGLES ROOFINGS
SPANISH TILE WINDOWS
CORNICE FIRE DOORS
SKYLIGHTS FIRE SHUTTERS
VENTILATORS CEILING

"MECCO" Spanish Tile

The modern, practical roofing material. A beautiful and substantial roof that adds so much to the appearance and value of the building.



Mecco Spanish Tile
Figure 231

When you roof with "MECCO" Spanish Tile, you can be sure that it will endure as long as the building. It will be proof against fire, rain, wind and lightning. It will not buckle or split from contraction or expansion.

Secures low insurance rate. Easily applied. Beautifies the building.



Mecco Metal Shingle
Figure 57
Justright Design
Size 10" by 14"

"MECCO" Metal Shingles

Moeschl-Edwards Galvanized Steel and Painted Tin Shingles are unusually attractive and durable; defy the ravages of storm, snow and ice. Guaranteed water-tight. Quick covering features make them advantageous to the contractor-builder. Shipped in wire-bound boxes to insure against damage or loss in transit.

MECCO

Metal Ceiling

With the many distinctive "MECCO" Patterns for Metal Ceilings and Walls, a wide range of appropriate, artistic designs are made possible. The most exacting requirements can be satisfied with this variety of designs, regardless of the type of building.

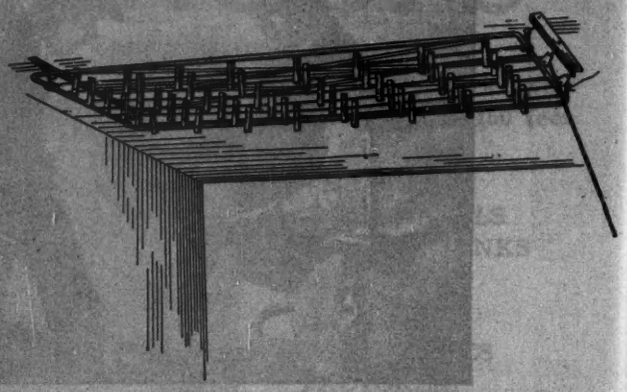
FREE: A complete set of catalogues illustrating and describing our entire line of fire-proof, sheet metal building material will be mailed upon application.

The Moeschl-Edwards Corrugating Co.

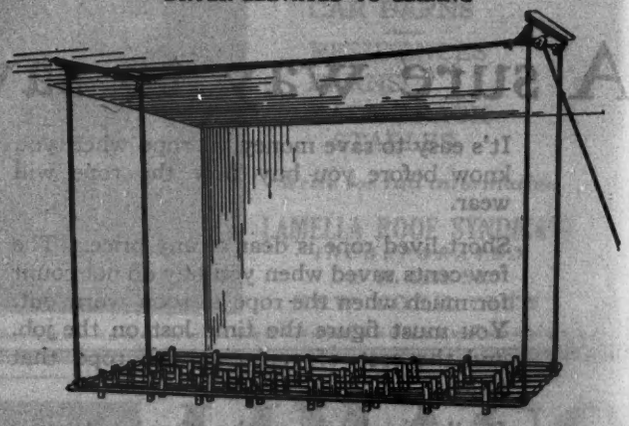
Everything in Sheet Metal Building Material

P. O. Box 709 CINCINNATI, OHIO Dept. A-B

A "Butler" For Service



DRYER ELEVATED TO CEILING



DRYER IN LOWERED POSITION

A Practical, Economical Necessity

Up at the ceiling the BUTLER CLOTHES DRYER hangs. These are some of its prominent features that will help you sell or rent your house—

Clean indoor drying—no soot.
No more exposure to cold and wind in hanging clothes.
No climbing of stairs nor lugging heavy baskets of clothes.
Eliminates for all time lines strung across room.
Allows freest circulation of air, as clothes hang individually from clip pins when being dried.
Fine lingerie and delicate lacy garments saved from destructive laundries.
Dries in any weather.
Easily installed—easily hoisted—easily lowered.

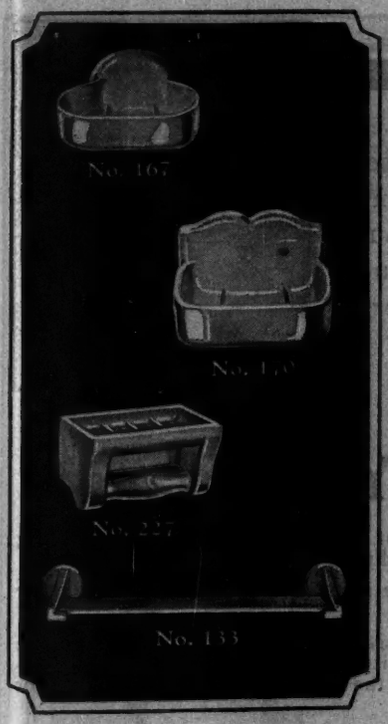
THE BUTLER CLOTHES DRYER

Is made of heavily tinned steel, electrically welded, with rounded ends. 48 clip pins moving freely on 6 rods. Gives more than 40 feet of drying space in this compact ceiling clothes dryer, measuring only 48 x 22 inches—small enough to take up little space in the kitchen, yet a giant in getting results. Capacity, an average family wash. Easily attached to ceiling by means of 6 screws (furnished with each dryer) for each ceiling connection. Neat—Attractive—Convenient.

Extremely low cost makes this the most reasonable of all modern conveniences and will prove a strong factor in selling or renting your house. Special trade prices to dealers and builders.

A few choice territories still open for distributors. Write for full details.

BUTLER LABORATORIES, INC.
41 Park Row, New York, N. Y.



Beautiful and Economical Bathroom Fixtures

THE beauty, the economy, and the practicability of "Easy-Set" white china bathroom fixtures render them ideal for the modern home.

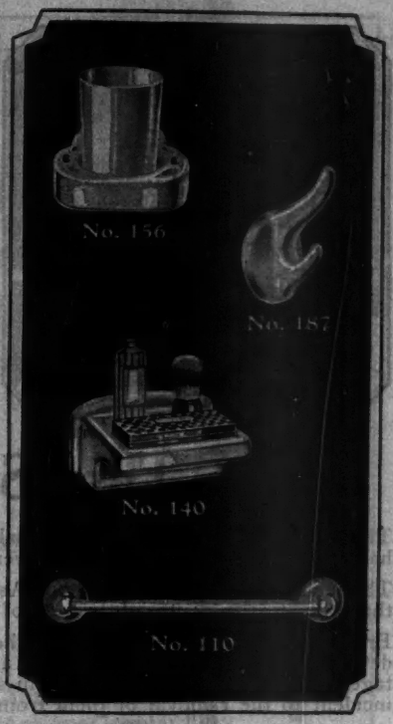
When remodeling is necessary they can be removed without defacing the walls. They have no visible screws—no sharp corners—and combine all the advantages of all lines of bathroom fixtures.

The cleated method of attachment permits of their being lifted from the wall and washed, so that the housewife can keep them always white and sanitary.

Specifications in Sweets or write to

J. H. Balmer & Co.

259-267 Plane Street NEWARK, N. J.



EASY-SET

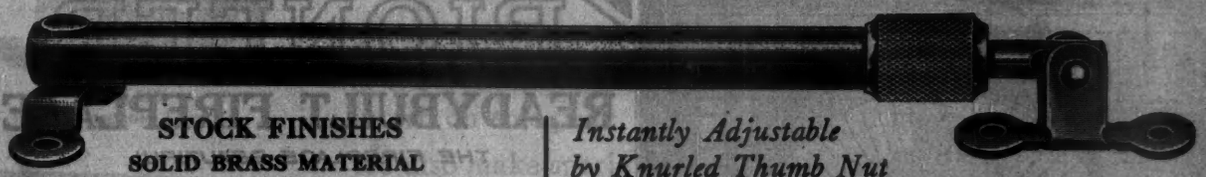
You can lift them off and wash them



CHINAWYTE BATHROOM FIXTURES

The modern fixture for the modern bathroom

LYMCO CASEMENT WINDOW ADJUSTER



STOCK FINISHES

SOLID BRASS MATERIAL

Size ½ x 10 Inches

Polished Brass	List	$20.40	per doz.
Satin Brass	"	20.40	" "
Old Copper	"	20.40	" "
Nickel Plate	"	23.50	" "

SOLID BRASS MATERIAL

Size ⅝ x 12 Inches

Polished Brass	List	$35.00	per doz.
Satin Brass	"	35.00	" "
Old Copper	"	35.00	" "
Nickel Plate	"	39.00	" "

STEEL TYPE WITH BRASS ROD AND NUT

Size ½ x 10 Inches

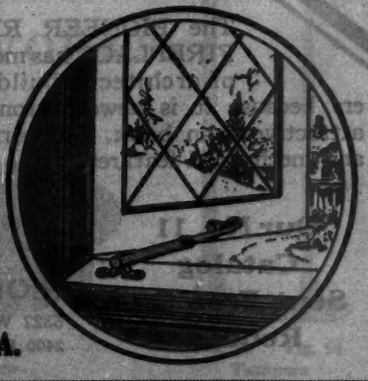
Galvanized	List	$15.60	per doz.
Brass Plate	"	15.60	" "

Side Shoes or Brackets for windows opening in can be furnished whenever required without extra charge.

Special finishes quoted on request.

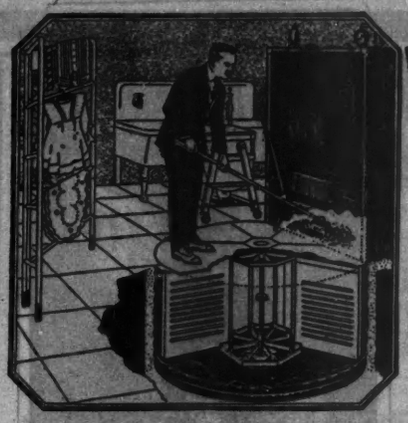
Instantly Adjustable by Knurled Thumb Nut

LYMCO Adjusters are giving the longest service because there are no complicated mechanical parts used in its construction. The friction lock is simply a metal sleeve (one piece) noncorrosive, tough, and resilient. This sleeve is assembled inside of knurled thumb nut. To make adjustments—you simply give this nut a turn or two. No tools required. It is not necessary to remove adjuster from casement. It can be done with window open or with window shut. When adjusted it will hold window in any position.

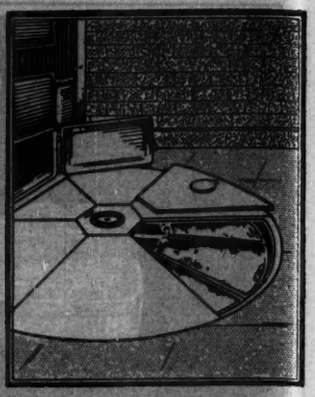


LYMCO Adjusters are a dependable product, handsomely finished in all popular styles. The proof can be found in an actual test. We are willing to do our share—your share is easy—send sample order.

THE LYONS MFG. CO. NEW HAVEN, CONN., U. S. A.



Frankly now—why should a basement be any less *orderly* than a living room? Any less *sanitary* than your kitchen? It doesn't have to be and it won't be if you install the *Sharp Rotary Ash Receiver.*



Add This Selling Feature to Your Plans

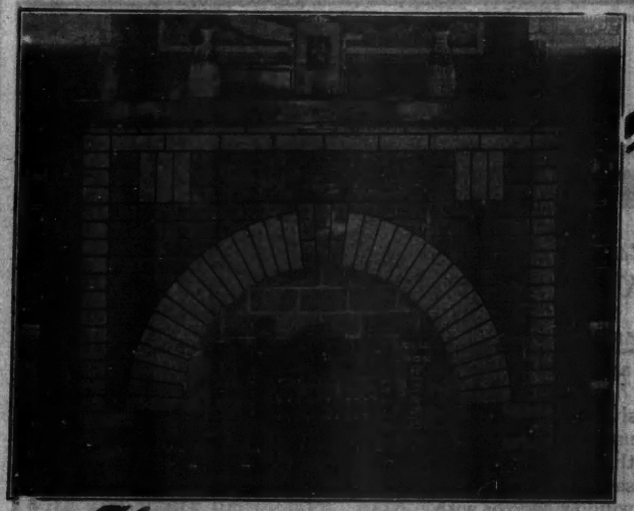
The Sharp Rotary Ash Receiver makes possible a more livable and cleaner basement. This feature will prove a selling help for any home. Prospective buyers are quick to appreciate your thought in providing for their convenience.

The installation of a Sharp Rotary Ash Receiver makes possible the utilization of space in the basement for purposes other than the storage of unsightly cans of ashes and rubbish.

Prominent architects are installing the Receiver in their own homes, which is conclusive evidence as to the merit in the device. Builders of homes, schools, apartments and other types of buildings are likewise becoming educated to the advantages to be gained by eliminating in some way the disagreeable features pertaining to the shoveling of ashes and the labor incident to the removal of them from the heating plant.

Let us send you full information on the Sharp Rotary Ash Receiver. Include them in your building plans at a slight additional cost. Write today for booklet and circulars.

SHARP ROTARY ASH RECEIVER CO.
331 Dwight St., SPRINGFIELD, MASS.



PIONEER
READYBUILT FIREPLACE
THE FIREPLACE BEAUTIFUL

Buy your Fireplace Readybuilt. A Fireplace that is neat and attractive and ready to set in place after the finished floors are laid.

Saves Time, Labor and Expense.

Can be installed in one hour's time at less than the cost of a brick fireplace.

The PIONEER Line is designed and produced by specialists in the art of making beautiful and practical fireplaces.

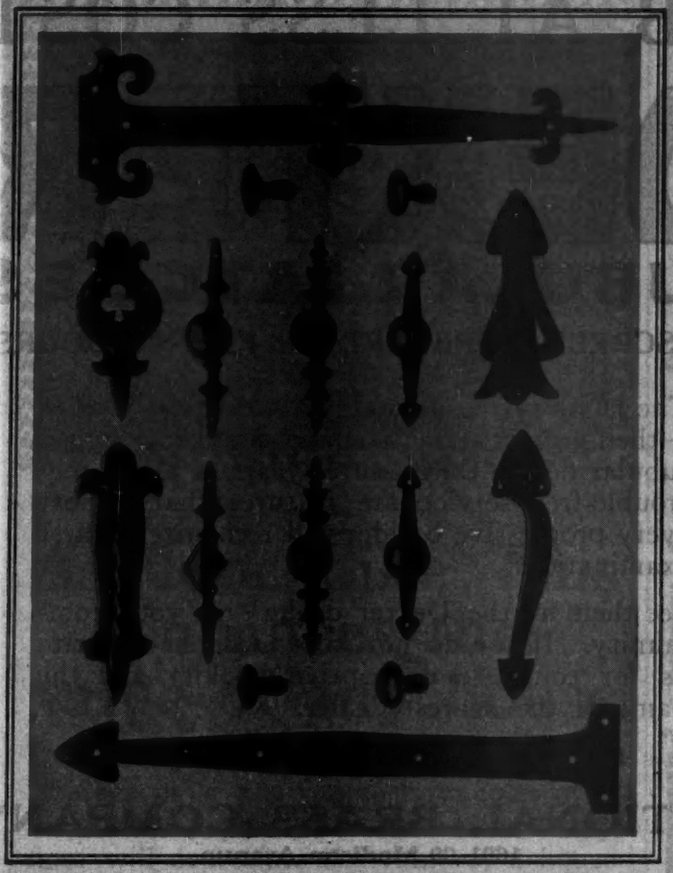
The PIONEER READYBUILT FIREPLACE has met the approval of architects, builders and owners because it is newer, stronger and more attractive than brick, and correct in design and mechanical features.

Our No. 11 Catalog Sent Free On Request

Write us today for full information and description of our various designs, suitable for bungalows, apartments or residences.

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2400 FREDERICK AVE., BALTIMORE, MD.

Our Agent's Proposition Will Interest You. Send for Information



MANUFACTURERS OF

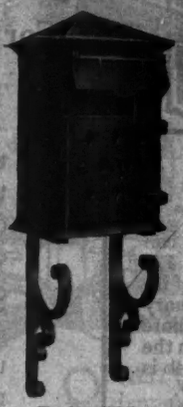
Custom Made Hardware

for

DISTINCTIVE HOMES

Quaint Effect at Popular Prices

Escutcheons adaptable to all Standard Interior Locks.



Design "A"

CONSOLE Mail Boxes

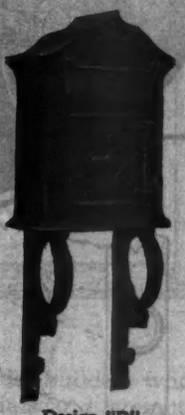
Cast Metal Box Size

7 in. x 10 in.
Over all 18 in.

—

Finishes

Dull Black
Antique Black
Antique Green



Design "B"

We have other designs and sizes.

Write for complete information and prices.

COLONIAL HARDWARE MANUFACTURERS
176 No. Clinton St. Chicago, Ill.

BUILDER'S SUPPLIES

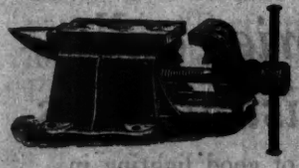


Fig 118
Household Vises

We manufacture many specialties required in the building trade, a few of which are shown on this page.

We also make special work from your blueprints, such as post caps and sockets, manhole frames and covers, stair treads and other fixtures.



Fig. 120
Jackscrews



Fig. 111
Ash Pit Doors

Send for our catalog. Ask your jobber for Swett's Products.

A. L. SWETT IRON WORKS
151 Glenwood Avenue
MEDINA, N. Y.



Fig. 153
Melting Pots



Fig. 116
Ash Dumps

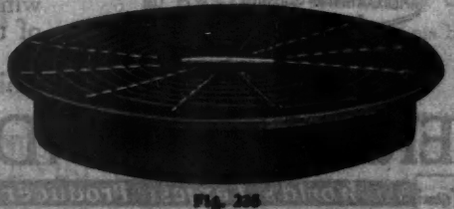


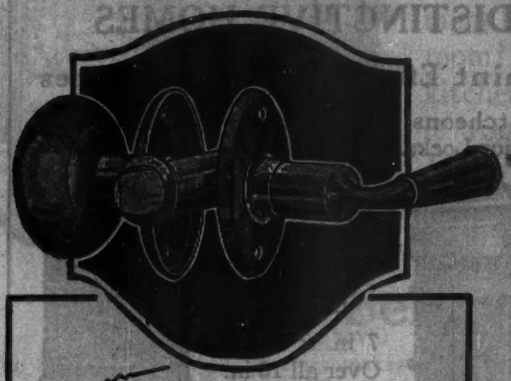
Fig. 236
Vault Frames and Covers

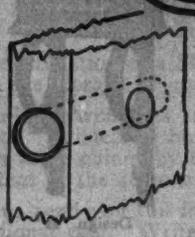


Fig. 93 Fig. 93
Tampers

A BETTER JOB AT LESS COST *with* DEXTER TUBULAR LATCHES

For SCREEN, CUPBOARD and FRENCH DOORS





Dexter latches can be installed at 1/5 the labor cost of installing theordinary latch. Simply bore two holes, slip in the latch and the job is done—perfectly.

Dexter latches are made in a variety of sizes and models including cupboard latches with glass and opal knobs.

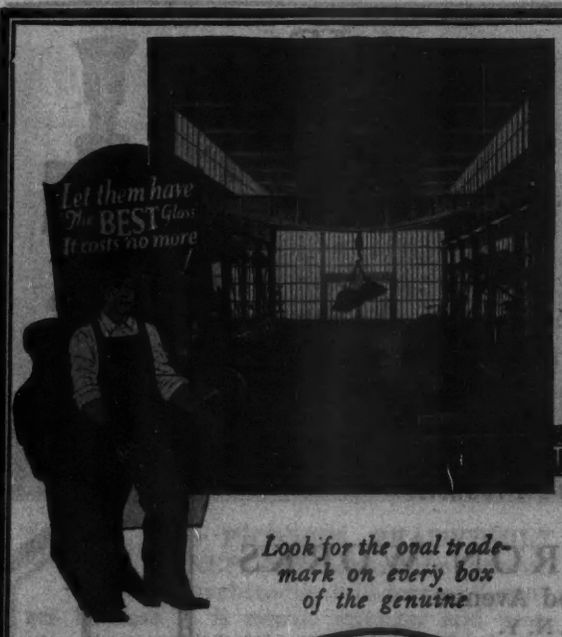


The labor saving advantages of Dexter latches —their greater attractiveness—and their rugged tubular design that assures years of absolutely trouble-free service are features that almost every progressive builder will recognize on first examination.

See them at the Dexter dealer's in your community. If you do not know who he is write us for complete descriptive booklet and the name of the nearest dealer.

Dexter latches are sold only thru dealers

NATIONAL BRASS COMPANY
1601-09 Madison Avenue
GRAND RAPIDS .·. MICHIGAN



Look for the oval trademark on every box of the genuine

AMERICAN WINDOW GLASS CO. Pittsburgh, Pa. U.S.A.

Daylight factories call for clear-vision glass

THE obvious need of good lighting in factories—both from the standpoint of safety and health of workmen, as well as efficiency and rate of production—has recently forced its attention on progressive manufacturers.

Whether bearings, buttons or biscuits are manufactured the sunlit factory rightfully claims superiority of its product. The pure unmixed light coming through perfectly clear window glass promotes accuracy, cheerfulness and cleanliness—forerunners of better products.

When providing window glass make sure that it is free from common defects and that it has uniform flatness and proper tensile strength. All these characteristics of better window glass are obtained in the factories of the American Window Glass Company by advanced methods of manufacture which lead the world.

AMERICAN WINDOW GLASS CO.

The BEST Glass — *World's Largest Producer of Window Glass* — The BEST Glass

GENERAL OFFICES: PITTSBURGH, PA. BRANCHES IN PRINCIPAL CITIES



A Floor Like This enhances the value of any house

The best floor you can specify, costs little more than a poor one. But an ordinary floor will depreciate the value of a house many times the cost of the floor.

There is a certain texture and beauty of pattern in "Perfection" Brand Oak Flooring unexcelled by any other oak flooring. Each strip matches perfectly with the other.

It takes a finish that is a credit to your good judgment. A "Perfection" floor will never need replacement and it will be a legacy that generations later will be proud of and enjoy.

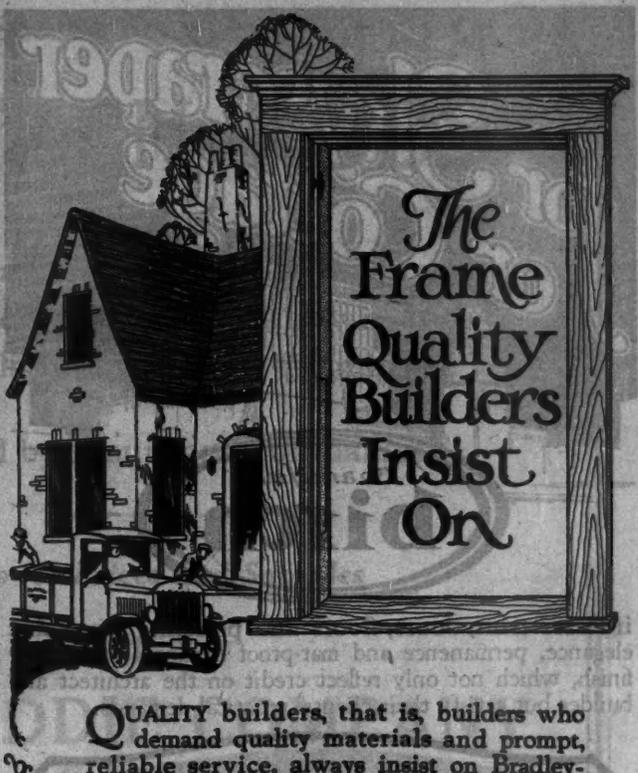
You will find better satisfaction with your work as a whole if you select "Perfection." Let us send you technical data and a copy of "The Overlooked Beauty Spots in Your Home."

ARKANSAS OAK FLOORING COMPANY

Pine Bluff, Arkansas

"PERFECTION"
Brand Oak Flooring

REG. U. S. PAT. OFF.



QUALITY builders, that is, builders who demand quality materials and prompt, reliable service, always insist on Bradley-Miller Michigan White Pine Frames.

They know that exposed parts of these frames are made of Michigan White Pine (Pinus Strobus), the finest wood possible to use in frames, that the workmanship is A 1 and that the frames are accurate to the last detail.

They prefer Bradley-Millers because they can get double-hung window frames, door, casement or cellar sash frames in almost any size, for any type of construction and in the pattern they like without delay. That's a service no other frame gives.

Bradley-Miller
Michigan White Pine
FRAMES

come in two bundles, tied with mar-proof cord and can be nailed up in less than ten minutes.

For quality, service and saving time and labor, insist on Bradley-Millers. Ask your dealer about Bradley-Miller quality and service.

Bradley, Miller & Co.
1200 Marquette Street
BAY CITY, MICHIGAN

MAIL THIS COUPON TODAY

BRADLEY, MILLER & CO. 1200 Marquette St., Bay City, Mich.

Gentlemen: Please send me booklet describing Bradley-Miller Michigan White Pine Frames.

Name .....

Address .....

Dealer's name .....

Address .....

Does Your Dealer Handle Bradley-Miller Frames? .....



interior trim, doors, floors and paneling assure that elegance, permanence and mar-proof hardness of interior finish, which not only reflect credit on the architect and builder but satisfy their clients' practical demands.



Dining room trim and furniture, all birch

Northern **birch** is equally adaptable to the modest home or finest office building. It gives excellent results with any stain, is unrivaled for enamels and exhibits rare beauty in natural finish. Its extreme hardness makes **birch** unexcelled for floors, waxed, varnished or stained. **birch** rotary-cut veneers are noted for their enduring elegance—the dense, close grain of **birch** prevents the tendency to checking, common to some woods.

Write us your experiences and ask us particulars. We are here to help you in every way.

THE BIRCH MANUFACTURERS
F. R. A. Building Oshkosh, Wisconsin

"Beautiful Birch for Beautiful Woodwork"

Neat, Rapid Lettering

no skill needed with the "NORMOGRAPH"

JUST follow the perforations in the template, that's all. An excellent method for lettering Drawings, Show Cards, etc.

No danger of smearing



Complete Outfit as low as $1.70

THE template is held in place, slightly above the paper, by means of a metal guide which slides along the T-square. No danger of smearing the lettering.

Templates for vertical and slanting letters; capital and lower case. The Pen has anti-clogging device. It is held in a natural, slanting position which does not obstruct the view.

More information and chart of sizes in Circular No. B5092

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VALUABLE INFORMATION

Our new folder on Anchor Brand Mortar Colors and Cement Colors contains valuable information on Mortar Colors and how to mix them. Fully explained in this folder are instructions on mixing for permanence and uniformity of color, and complete formulae for obtaining the many color effects possible with Anchor Brand Mortar Colors. (Your dealer can supply you with Anchor Brand Mortar Colors.)

Also in this folder you will find complete specifications and directions for coloring, mixing, troweling, laying and tiling concrete for colored concrete floors, porches, walks, etc. This folder is free of charge to anyone interested.

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C. K. WILLIAMS & CO.
Easton, Pa.

CLIP THE COUPON

C. K. Williams & Co., Easton, Pa. AB

Gentlemen:—I am interested in your new folder on "Anchor Brand Mortar Colors and Cement Colors" and would be pleased to receive it.

Name.....

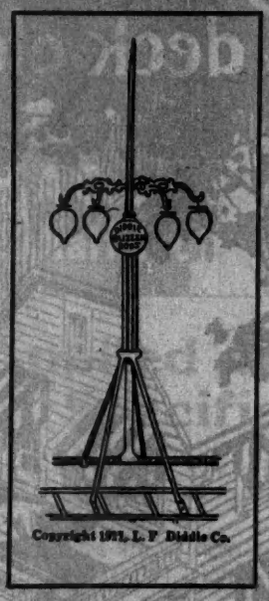
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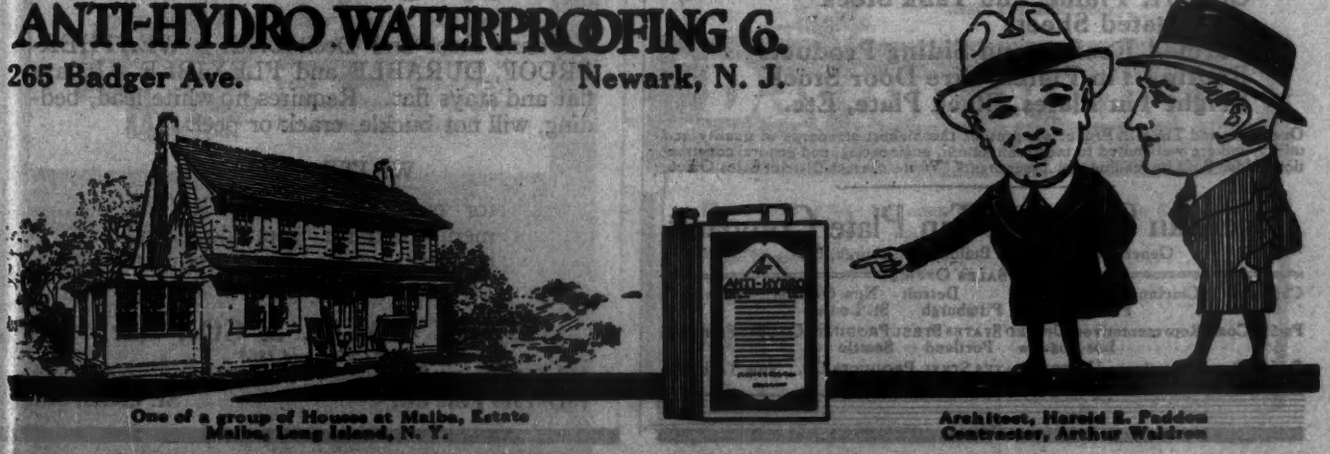
This house is one of a group built on ground from which many springs flow. The cellars of them all, however, are always dry because the concrete foundations, walls and floors are *permanently* waterproofed with "ANTI-HYDRO."

No matter how large or small your job may be, you will find "ANTI-HYDRO" the most satisfactory as well as the most economical concrete waterproofer and hardener you can use. It both hardens and waterproofs in *one operation.*

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The Improved DAYTON "CUB"



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The "CUB" pictured above, with a capacity of 200 gallons per hour, is unquestionably the greatest water system value ever offered. This is but one of a complete line of water systems for any running water supply requirement.

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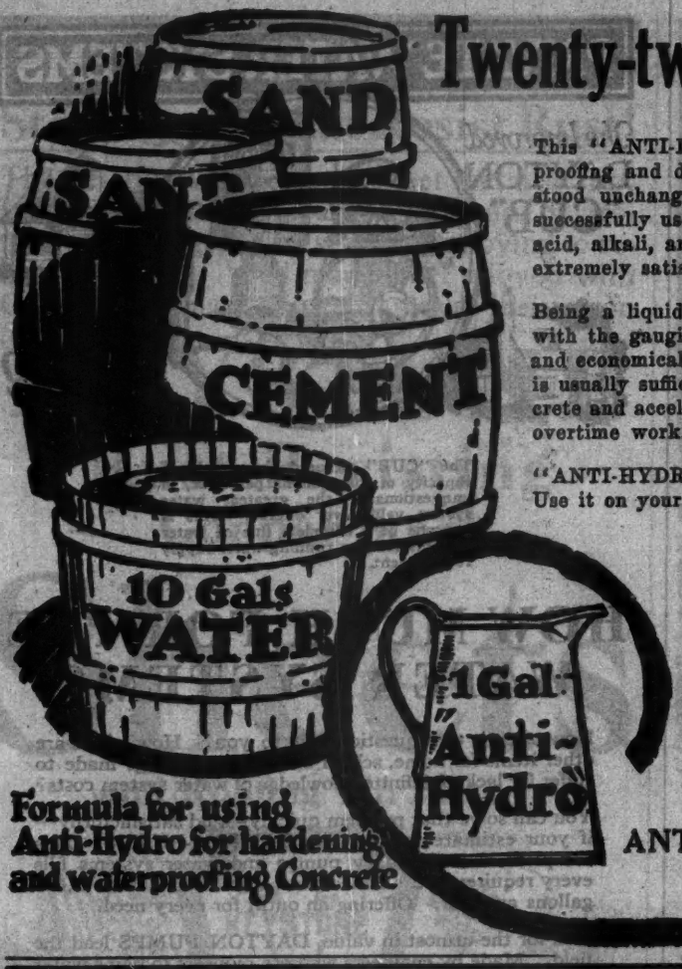
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"ANTI-HYDRO" is the oldest compound of its kind in existence. Use it on your next job for real, lasting satisfaction.

KEEP THIS TABLE FOR REFERENCE

	Cement	Sand	Stone	Anti-Hydro to water	One gallon covers
Mass Concrete	1	3	6	1:10 or 15	2/3 yards
Plaster Waterproofing and Floor Topping	1	2		1:10	1"-100 sq. ft.
Stucco Undercoats	1	3		1:10	Both coats 50 to 100 sq. ft.
Stucco Finish Coats	1	2½		1:10	
Brickwork Above Grade	1	3		1:15	1000 brick or 50 cu. ft.
Brickwork Below Grade	1	2		1:12	700 brick or 35 cu. ft.
Acid Resist. Tank Lining	1	1	1-grit	1:8	¾"-50 to 100 sq. ft.
Road Work	1	2	4	1:10	2/3 yards
Grout	1			1:8	600 ft. 1 coat

Formula for using Anti-Hydro for hardening and waterproofing Concrete

ANTI-HYDRO WATERPROOFING CO.
265 BADGER AVE., NEWARK, N. J.

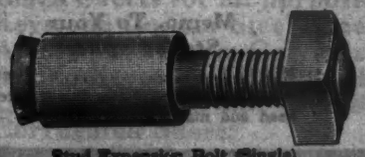
Ackerman-Johnson



Expansive Screw Anchor



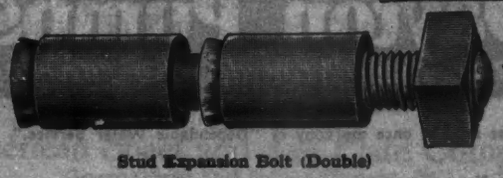

Single Screw Clamping Pipe Strap


Stud Expansion Bolt (Single)

Ackerman-Johnson Expansive Screw Anchors hold greater load, particularly an agitated load, than any other expansive fastening made.

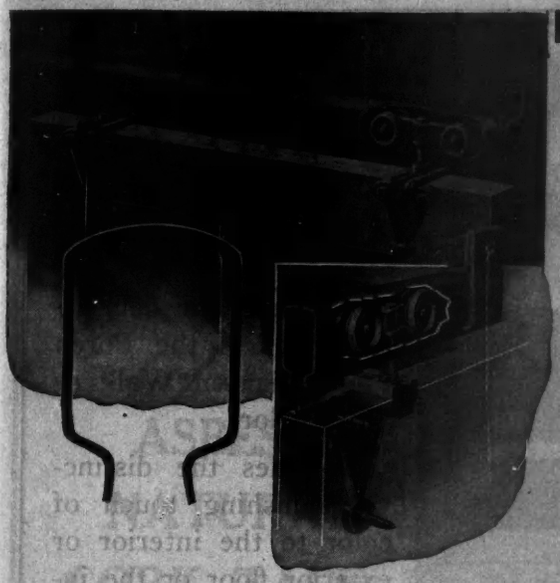
To drill the concrete and complete a fastening requires but a fraction of the time taken for any other method and the saving is often more than the cost of the anchors.

Ackerman-Johnson Expansive Screw Anchors excel equally for fastenings to all the vitreous substances from plate glass to concrete and rock and that excellence has been substantially recognized by the larger contractors and construction engineers of the United States and parts of the world abroad.


Stud Expansion Bolt (Double)


Concrete Insert

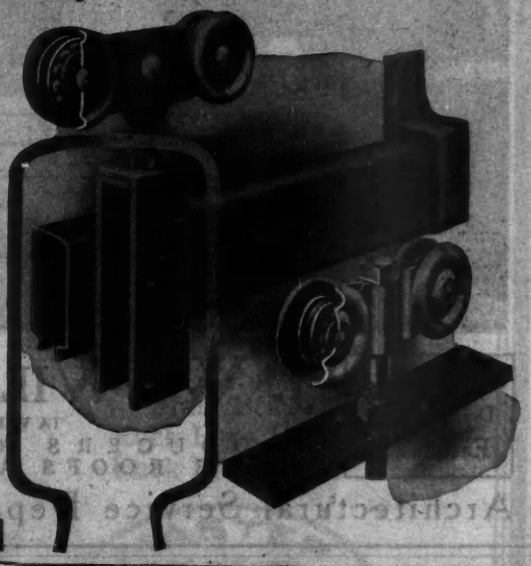
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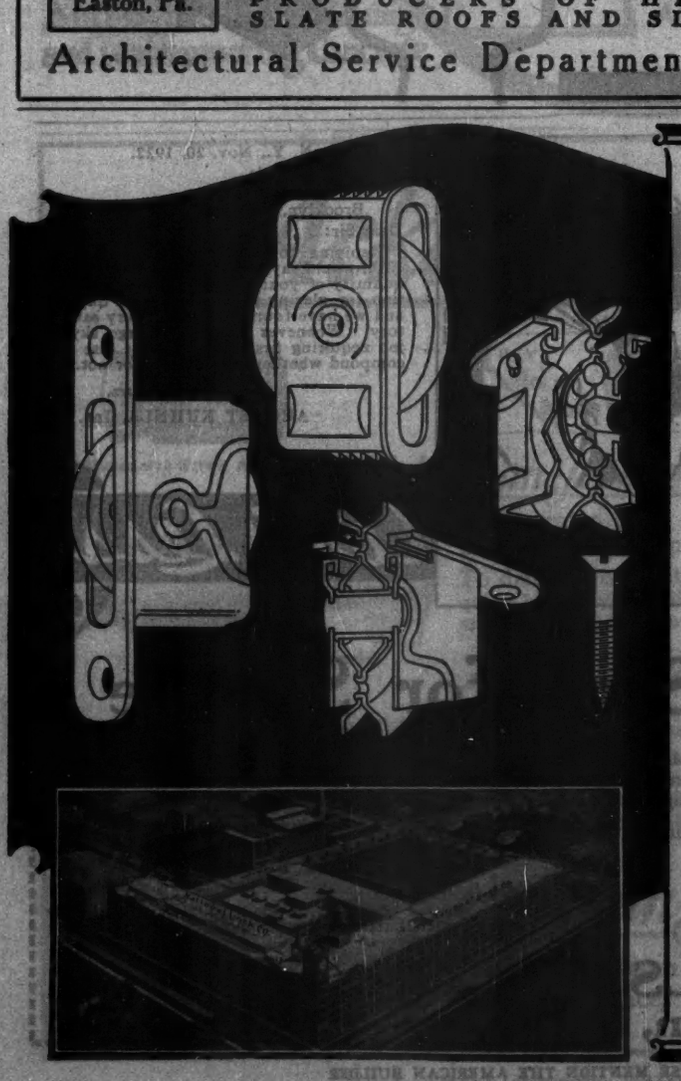
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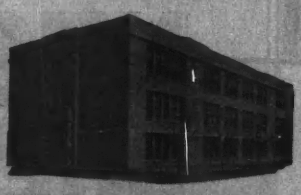
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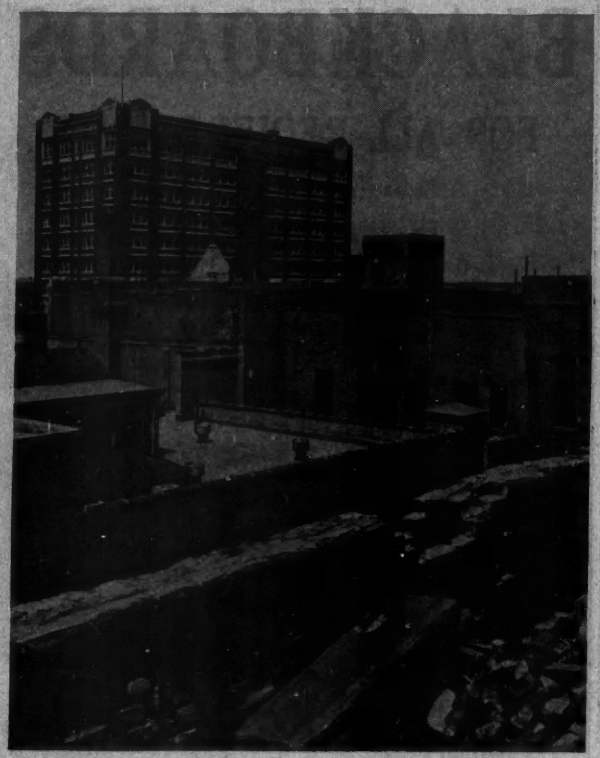
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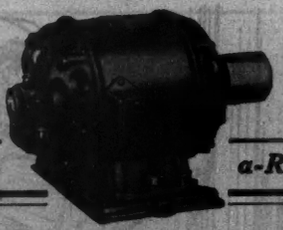
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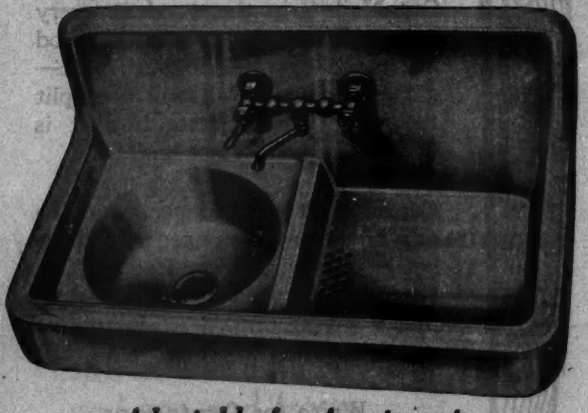
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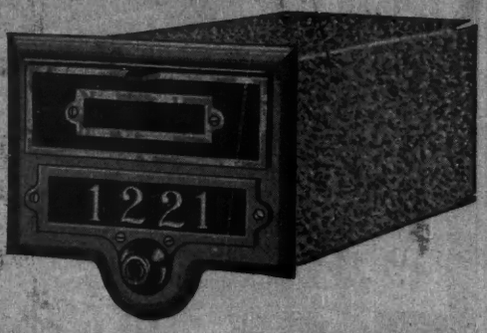
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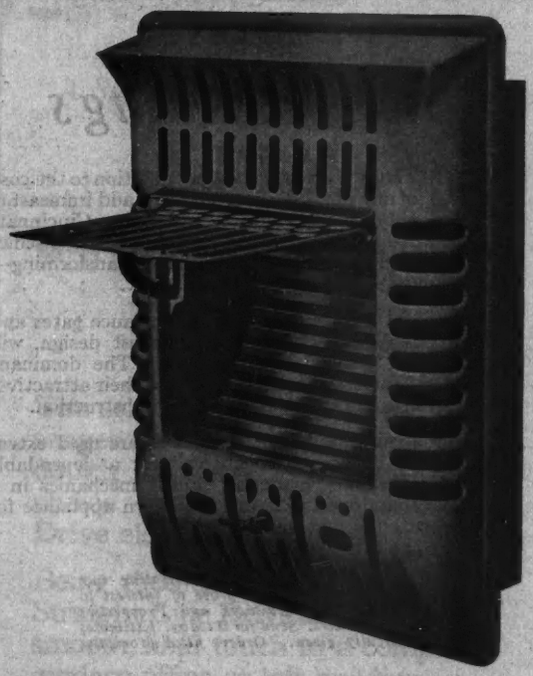
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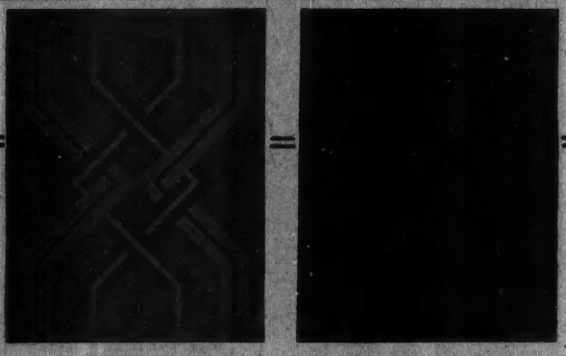


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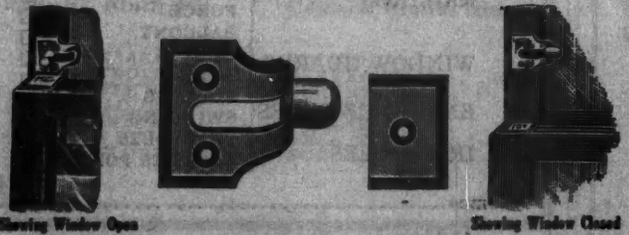
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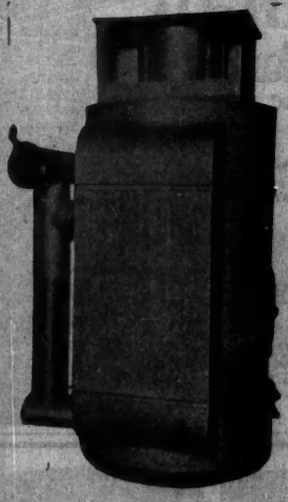
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Outside Diameter Combustion Dome				
Size Floor Casing	28"x28"	34"x34"	38"x38"	42"x42"
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Capacity Cubic Feet Rooms	9,000	11,000	16,000	20,000
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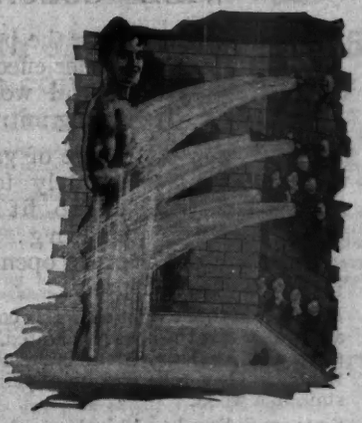
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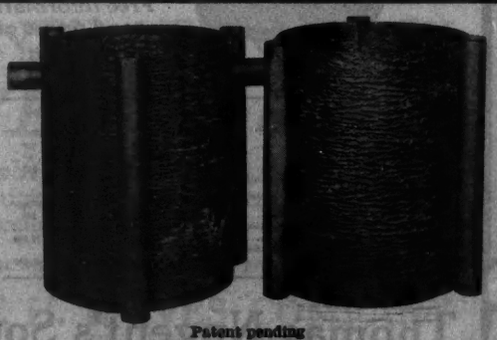
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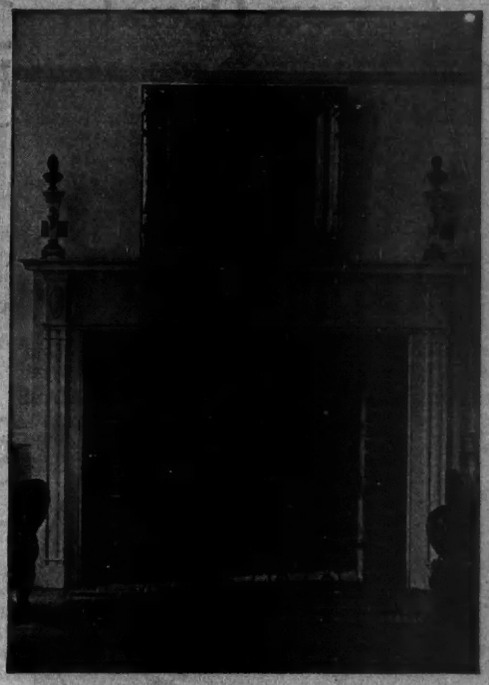
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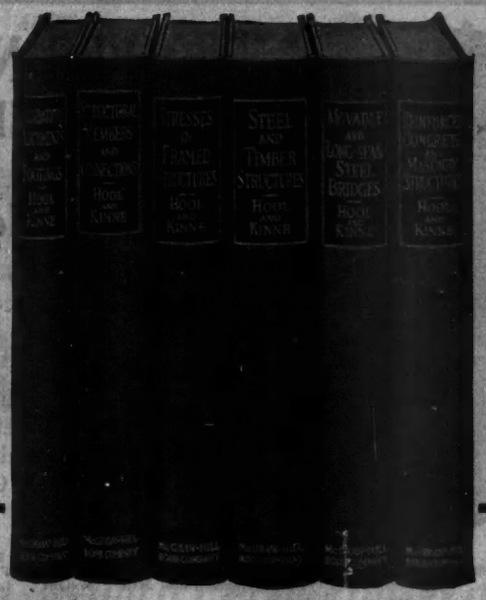
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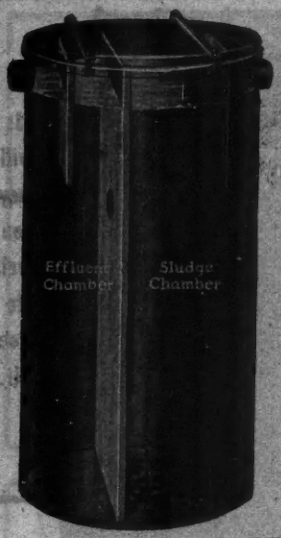
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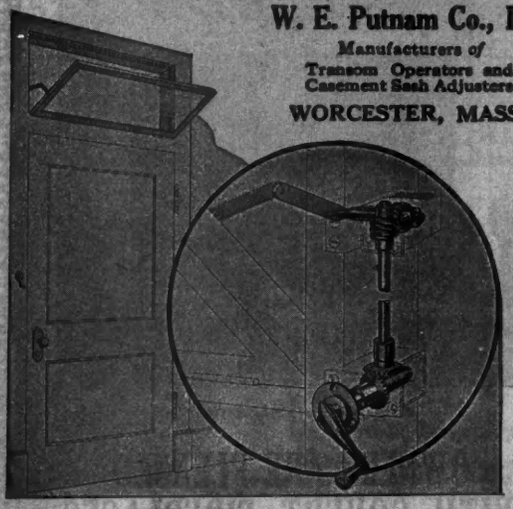
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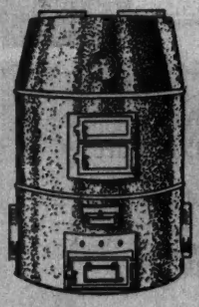
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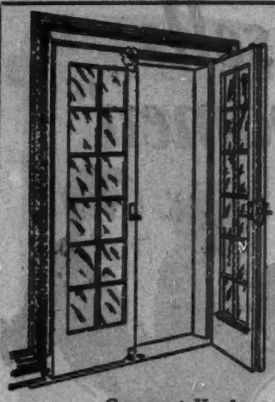
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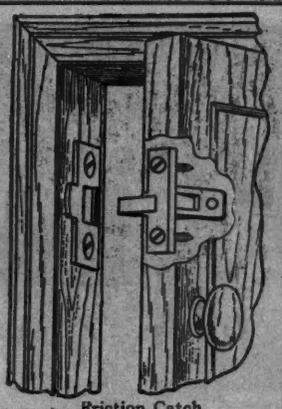
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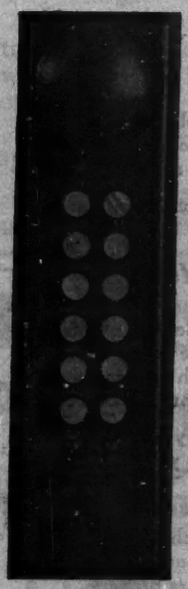
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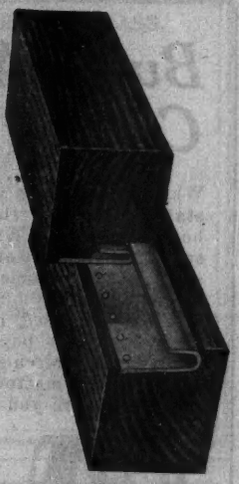
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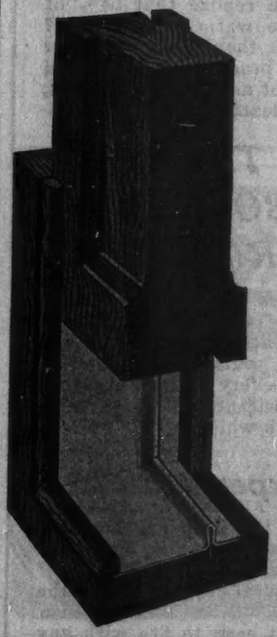
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JOHN W. KIESLING & SON, Inc.
Established 1892 Incorporated 1923
1797-81 Atlantic Ave., Brooklyn, N. Y.





Sacred Heart Seminary, Detroit, Mich.



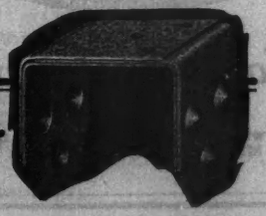
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A Billion Dollars Worth of Modern Structures

If you asked us for direct proof of the practicability and economy of the Bull Dog method of anchoring wood floors to concrete, we could refer you to some of the finest buildings in America. Office buildings, schools, apartments, hotels—models of architectural genius and representing an investment of more than a billion dollars—have been built better and more economically during the past few years with Bull Dog Floor Clips.

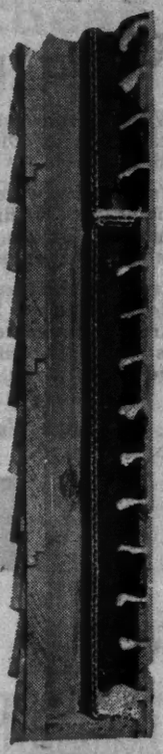
Have you a copy of "Six Quick Steps"? It shows exactly how much you save by using the Bull Dog method of floor anchorage. Ask for it and for samples of Bull Dog Floor Clips.

Bull Dog Floor Clip Co.
WINTERSET, IOWA
90 Branch Sales Offices
15 Convenient Distributing Points



BULL DOG
Floor Clips

INVINCIBLE HOUSE LINING



"PATENTED"

At last, a practical, efficient and inexpensive house lining.

Mr. Contractor, Architect and Engineer, are you going to line that new modern home for your client? Remember that a penny spent in house lining means dollars saved in fuel.

The more the insulation the more the economy. With this scientific insulation you can have as many dead air cells and heat pockets as your particular insulation problems may require.

An overcoat without a lining is not much comfort in zero weather, why build a home without this lining comfort, which is so inexpensive and so necessary? A warm comfortable home is a builder's best asset.

Invincible House Lining Co.
422 Lincoln Street
JANESVILLE, WISCONSIN

On Sale at all Building Material Dealers.



ONE PIECE SILENT WATER CLOSET

The beautiful design, quality and construction of this fixture make it ideal for the finest installation and the moderate price makes it available for the more modest homes.

SAVES LABOR ON INSTALLATION

Only two connections—outlet from bowl and supply to tank. Comes all in one piece—no tank to attach to wall. Can be installed in any roughing-in twelve inches or over.

Non-overflow, quiet in operation and is made of the highest grade vitreous china. Cover fastened to tank. High quality fittings throughout. Furnished with either white or mahogany seat.

Write for full details on our complete line of supplies

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$90.00 BUYS THIS



Simplex
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No Money Down

Order this Simplex Level for a ten-day *Free Trial. Use it.* Test it for your every use. *You* decide whether it's the level for you. We know what our level is. We want you to know the fine points of the Simplex. We guarantee the Simplex in points of accuracy and workmanship. Made in three types—Convertible for $90, Dumpy for $65 and Farm or Carpenter's Level for $25. Let us send you full information on the Simplex. Just mail us the coupon below. We are offering to dealers an attractive proposition.

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New York Blue Print Paper Co.

Gentlemen: Please send me full particulars regarding your free trial—No Money Down offer and Time Payment Plan—also complete descriptive literature covering the Simplex Line.

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A feature giving even greater dominance to the Refinite Water Softener is the lever control for regeneration. Let us explain this handy control. Write today for our free booklet.

Know why Refinite Excels!

Whether considered from a purely mechanical standpoint or from a standpoint of the mineral used, the Refinite Water Softener has no equal.

Unlike other water softening agents Refinite mineral does not discolor the water. Refinite is a natural mineral which regenerates in 45 minutes. It has fully three times as much water softening capacity as the minerals used in other plants.

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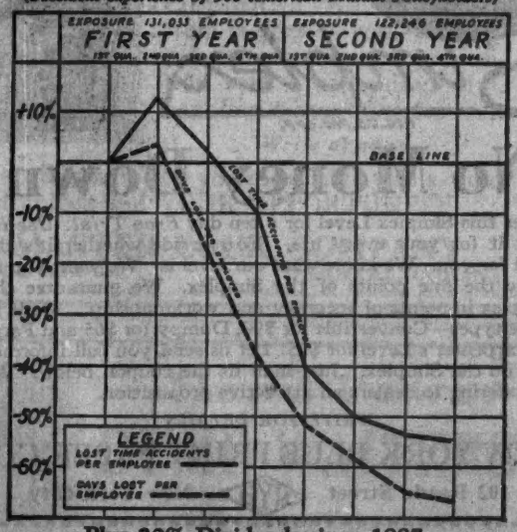
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Water Softener

Refinite, equipped with our Rapid Regenerator, is also made for Laundries, Textile Mills and Industrial Plants.

An Engineering Service that

Reduces "lost time accidents" 49.8%
and "days lost per employee" 53.8%
(Accident experience of 500 American Mutual Policyholders)

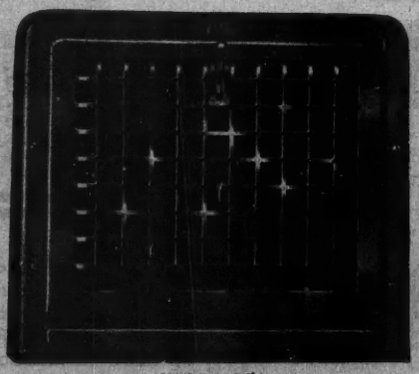


Plus 20% Dividends since 1887

Let us show you how we can save you time and needless expense.

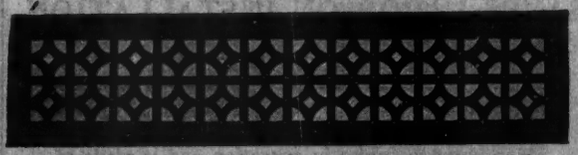
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ORGANIZED - 1887
OLDEST · LARGEST · STRONGEST in the WORLD



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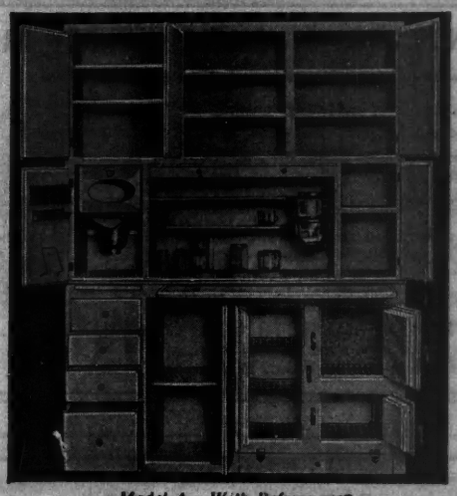
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Registers of every type, size, finish to cover all the requirements for Heating and Ventilating, Also Grilles for Radiator Enclosures

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Model A—With Refrigerator

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KOZY KITCH equipment makes selling a home easier —renting an apartment less difficult. There's more profit for you because you save by reducing the size of the Kitchen. KOZY KITCH UNITS are built to a uniform depth of 20 in. Units may be added or taken away at any time.

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Cheap Imitations *and Dissatisfaction!*

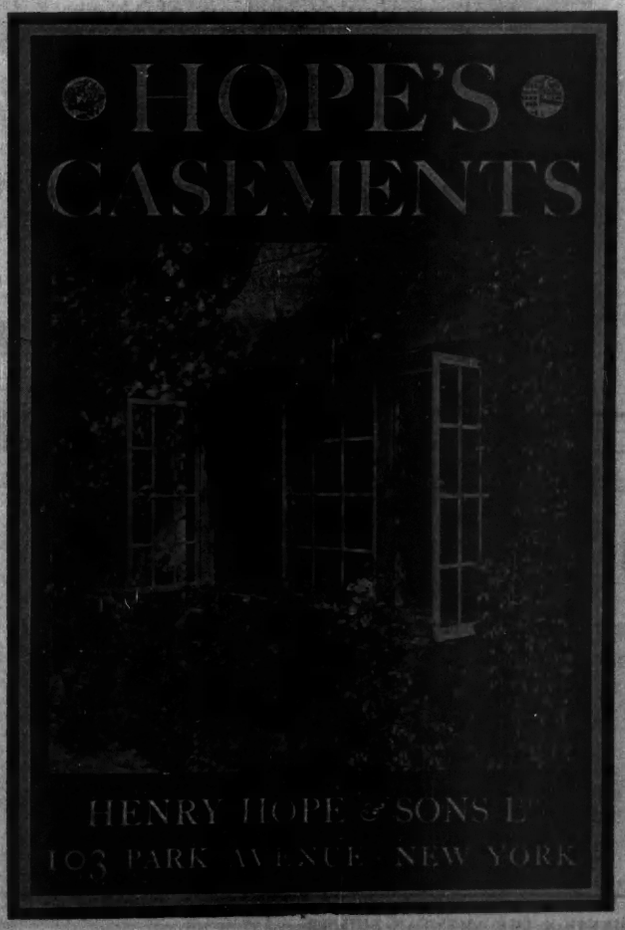
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Anybody can apply Wirfs Home Comfort Weatherstrip. Just tack on. Hammer only tool needed. Tacks are furnished.

Easy to turn corners. No mitering. Forms a perfect joint. Weather, dirt and dust-proof. Wears for years.

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Contractors Accurate Estimating Book

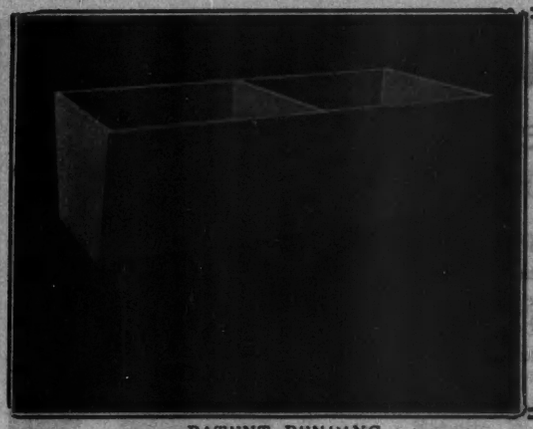
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Made in standard sizes—one, two and three compartments

Are absolutely sanitary, rust-proof and leakage proof.

Are manufactured in one piece, free from joints, seams, bolts, metal trimmings or metal rims.

These trays are case hardened in a scientifically designed hardening chamber which produces a product of uniform strength.

CASTLE LAUNDRY TRAYS—SLAGSTONE LAUNDRY TRAYS

Are exceedingly low in absorption, expansion and contraction qualities and can be subjected to extremes of heat or cold without damage or detriment.

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Manufactured by

SLAGSTONE PRODUCTS CORPORATION

***Factory*—New Castle, Penna.**

***General Offices*—Oliver Bldg., Pittsburgh, Penna.**

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SHADE ADJUSTER
Down from the Top

Tomlinson's approved Shade Adjuster makes window shades wear longer, fit any window; can be installed in a few minutes and lasts a lifetime. Permits more light and ventilation. Practical for office, school, home, hospital or hotel. Write for full information and prices on this approved window shade adjuster.

Guaranteed for 5 years.

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To Catch the Eye and Use for Advertising Points

Our frames are built on the knowledge gained by the people of the different sections of the country as to what is most desirable

To Resist Time and the Elements

in that particular section of this great country of ours, where the frame is to be used.

They are built entirely of

TILLAMOOK SOFT FIR
A MOST DURABLE WOOD

THE WHITNEY COMPANY
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ALDERMAN'S
ROCK GUM FLOORING
End-Matched, Hollow-Backed, Kiln-Dried, Bundled

13/16 x 2 1-4 in. fc. counted 1 x 3

Is scientifically cured and will not warp, shrink, splinter or sliver. Its wearing qualities are excellent.

For nice homes, schoolhouses, stores, factory, and public buildings, we know of no flooring today that can compare at the price, for service and appearance, with ALDERMAN'S ROCK GUM, popular-priced, kiln-dried, HARDWOOD flooring. We are always glad to quote prices and furnish any information desired.

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For Weatherstrip Men
Who Want More Profit From
Their Own Business

Here is a straightforward offer from a weatherstrip manufacturer who after many years still retains 97 per cent of his original agents. Perhaps the service facts that follow would help your business. These show why Ceco agents do not change. Read them carefully: (1) Shipments in 24 hours—any style or size strip. (2) Strips absolutely straight, mechanically perfect. (3) Careful packing and delivery—no damaged strips. (4) Complete selling and advertising aid. (5) Square dealing on every order.

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Ceco **METAL WEATHERSTRIPS**

Write Dept. 7-A

Ceco Weatherstrip Co.
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FEDERAL METAL WEATHER STRIP

Start a Business of Your Own

Do you want to progress and earn more money? Would you like to give your family the extra comforts which an increased income can buy? There is a way. Start in business for yourself and use your brains and energy to make money for yourself and not for the other fellow.

We want a few live contractors who are looking for an all year round money making proposition with a chance to make an honest-to-goodness living.

Every home, apartment house, office building, school, church, hospital, etc., is a prospect for Federal Metal Weather Strips. They are easy to sell and easy to install and so popular that one installation invariably leads to another.

Write us today if you are interested. It means money in your pocket.

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FREE CATALOG 48 pages illustrating and describing our complete line of plumbing and heating supplies that SAVE YOU HALF. Guaranteed "A" grade equipment.

Write today for your copy.

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938 Spring Garden St. Philadelphia, Pa.

LITTLE IN SIZE
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BIG IN CAPACITY

A most economical water heater for **Residences, Greenhouses, Garages, Stores, etc.**

Capacities from 200 to 1,200 square feet

Burns any fuel and garbage

Unequalled for Supplying Hot Water Service for Residences, Apartments, Hotels, Hospitals, Schools, Barber Shops, etc.

Capacities from 40 to 1,400 gallons per hour

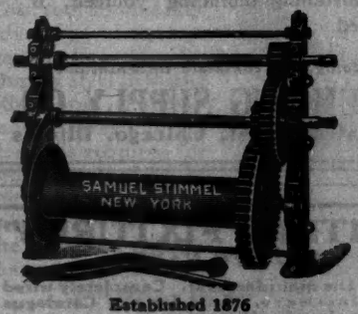


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Its Insides Are Different

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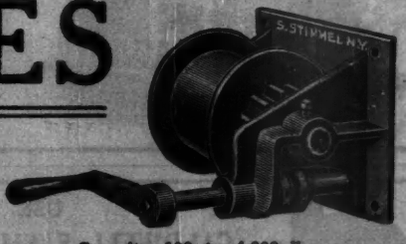


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Manufacturers of winches for all purposes. Power, Electric and Hand Winches. For Motor Trucks, Tractors and general purposes. Also Rollers for Lumber Trucks.

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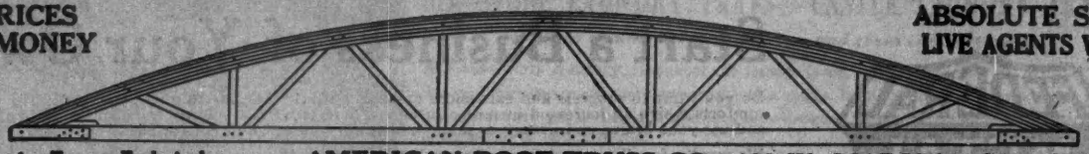
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Safety worm geared winches.

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Built on Job by Us. Erection Optional
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Wood Bowstring Trusses Exclusively
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$34.50
Complete, ready to install, 60 lb. capacity. Hight, 20 ft.

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75 lbs. capacity. Equipped with automatic brake

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Disappearing Type
Sets flush with floor when not in use

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Painted or Galvanized Shingles

Cortright painted tin shingles come either red or green.

Cortright Galvanized Shingles come Hand Dipped or stamped from sheets already galvanized.

Our Hand Dipped Shingles are made from prime roofing tin.

All can be had in four patterns.

We'll be glad to send our booklet, "Concerning That Roof."

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For Waterproofing and Dampproofing
Roofs—Floor—Walls and Basement Foundations
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Fireproof—Unrestricted Parking
600 Rooms
500 Baths
Rooms with running water from $2.50 per day
Rooms with private bath and shower from $3.50 per day
Food and Service the best
Near West Philadelphia Station Pennsylvania Railroad
Oscar W. Richards Manager

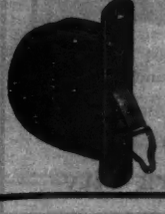
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Special proposition to dealers.
ERIE FIXTURE SUPPLY CO.
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CURTIN NOISELESS TANK FITTINGS



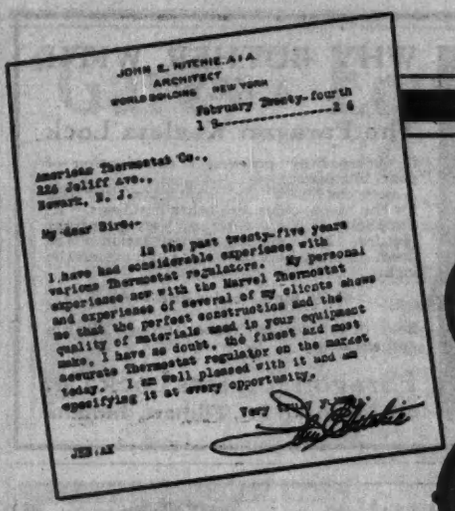
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Economical to install, non-corrosive and effect a great saving of water. Often used on replacements as they will fit any low closet tank.



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Ask "Marvel" owners. Convince yourself of the facts. Hundreds of testimonials from satisfied owners attest to its accuracy and dependability. "The Master Mind of the Heating System" is always on the job. Working automatically it operates faultlessly on all heaters and boilers. Save on coal bills—save time—save labor. Investment in a "Marvel" Thermostat means health and comfort.

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GF Duplex STEEL BRIDGING

Because they cut time cost

You, too, should take advantage of the saving in time that GF Duplex Steel Bridging offers you. Furthermore, it takes only half the nails required for ordinary wood bridging and it never cracks, splits or warps. Save the time and trouble that cost you money.



A twist of the wrist and four nails puts GF Duplex Steel Bridging there to stay.

Free sample and literature sent on request.

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Branches in all Principal Cities. Dealers Everywhere.

RATTLES — A·B·C WEATHERSTRIPS APPLIED

KEEP OUT DUST, COLD AND STOP RATTLES — A·B·C WEATHERSTRIPS APPLIED HERE

Make More Money Than Ever Before

Build up a good business of your own. Profits are limited only by your own ability. Let us show how you can do this. Represent us in the installation of

A·B·C·
Pat. March 20, 1924.
Other patents pending.

Practically no investment necessary—just a hammer and a few A B C Strips. Start by yourself and add men as you grow. Your friends and neighbors are live prospects.

Weatherstrips
Pat. March 20, 1924.
Other patents pending.

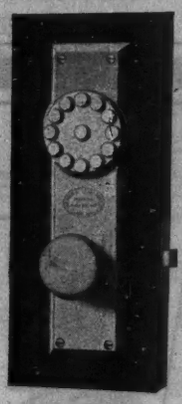
A B C (All Bronze Construction) weatherstrips are installed without removing or grooving the sash. They are neat, efficient and inexpensive to install. You can get profitable contracts from owners of big buildings and from schools as well as home owners.

Send $1.00

for complete materials to weatherstrip one double hung window, including installation instructions. Then get busy and sell the idea to your prospects that are everywhere in your city.

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Attached is $1.00. Send me A B C Weatherstrips for one double hung window.
Name.....
Address.....

A·B·C· WEATHERSTRIPS APPLIED HERE KEEP OUT DUST COLD AND STOP



WHY BOTHER WITH A KEY?

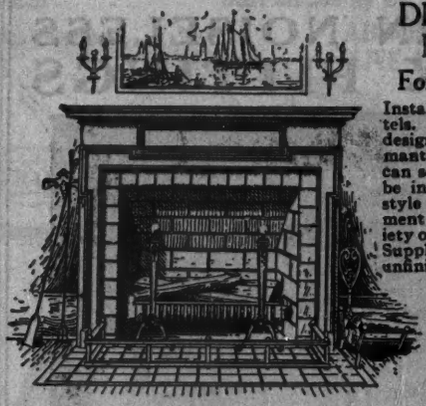
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is operated by pressing a combination of pearl buttons.
A very convenient and ornamental door lock for the home, office and other buildings.
Simplicity of installation is a very important feature. No mortising or mutilation of the door. Simply bore four holes and attach the lock.

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Sold direct to user, also through dealers and agents.

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DECORATIVE MANTELS

For The Fireplace

Install ready-made mantels. Perfect symmetry of design is built into all mantels we make. You can select a type that will be in harmony with any style of decorative treatment from the great variety of patterns we furnish. Supplied in any finish or unfinished if desired.

Send for booklet showing various types installed.

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Garage Necessities



Garage Door Bolt

Specially designed for garages, factories, warehouses and fire doors. Locks and unlocks top and bottom bolt with one turn of handle.





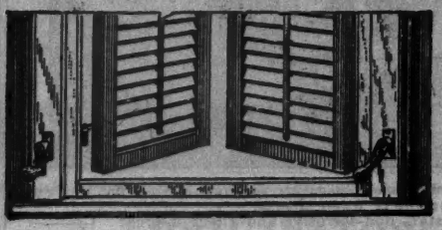
Garage Door Holder

Prevents accidents, broken head lights and fenders. Operated by hand or foot.

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Mallory Shutter Workers fill a need long felt. There is no chance of damage to curtains or floor coverings when the Shutter Worker is used as the window does not have to be opened to operate the shutter. It is all done from inside with a small ornamental crank or handle which improves the finish of the room.

In stormy weather with shutters bowed together and handles slightly tightened you will find all necessary ventilation can get in through opened window without having the snow or rain ruining inside woodwork or other articles in the bed room.

Easy to install and by using the direction cards sent out with orders any good carpenter can place them on your dwelling in a little time. Have in many types to handle almost any style of shutter or installation, whether ordinary frame house shutters or deeply recessed in stone or brick which can be handled with six inch throw workers.

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BRACE & MACHINE

THE FINEST Tool Manufactured for important wood work.

Specially adapted for Hardwood operations; indispensable to the High Class Carpenter and for Cabinet and Pattern Work.

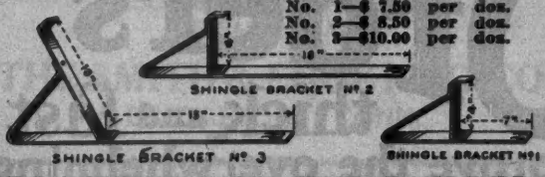
Manufactured by

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A sample bit up to 1 inch in diameter will be mailed postage prepaid, upon receipt of 75c to any woodworker or carpenter.

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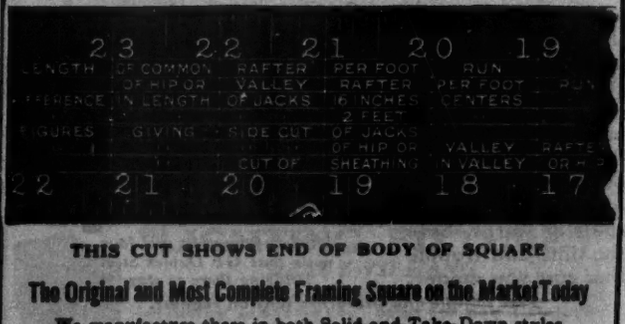
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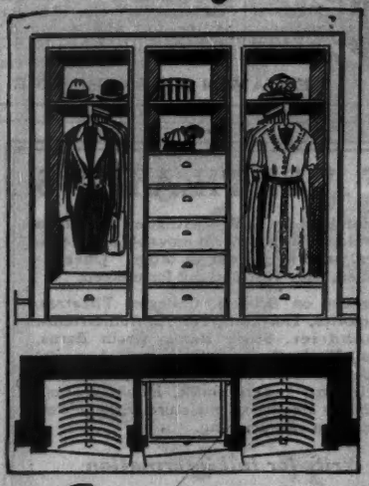
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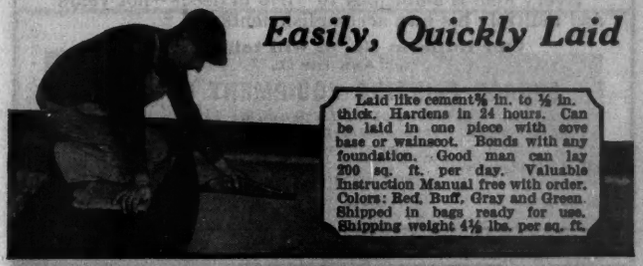
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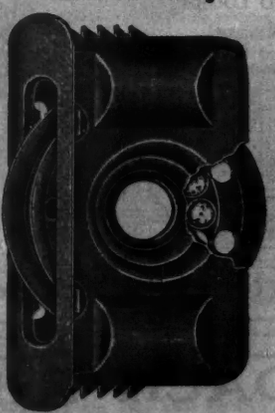
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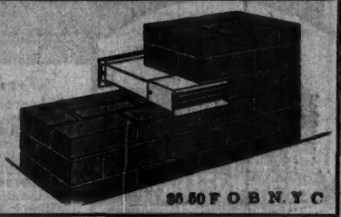
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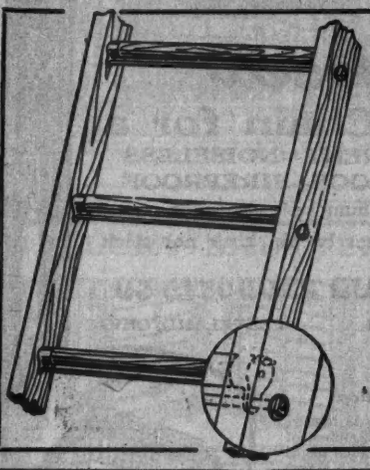
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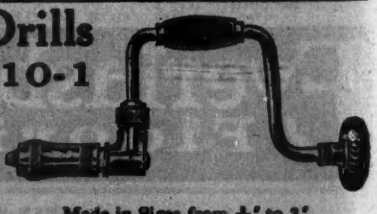
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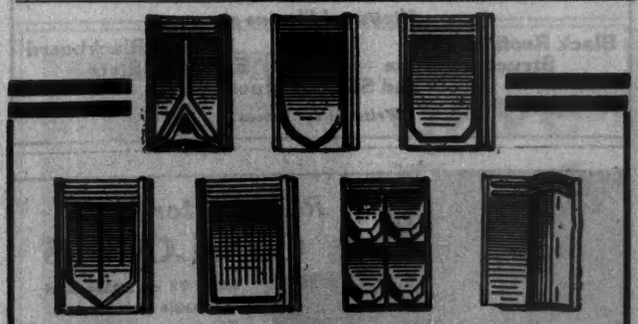
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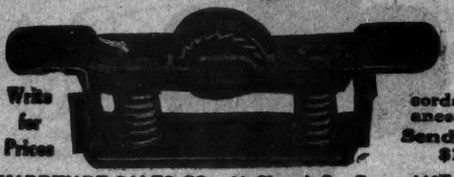
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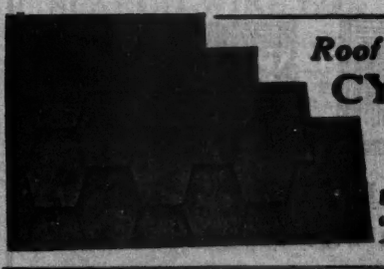
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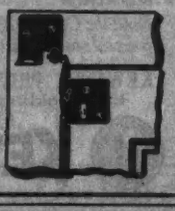
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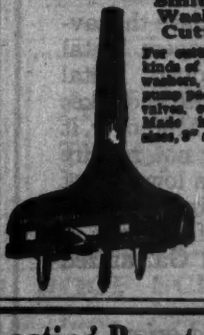
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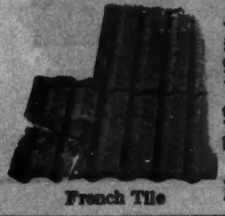


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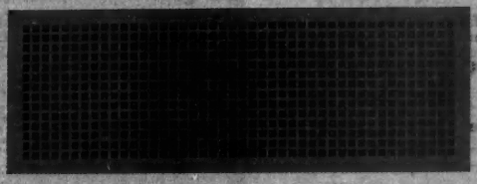
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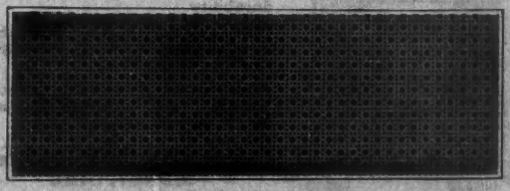
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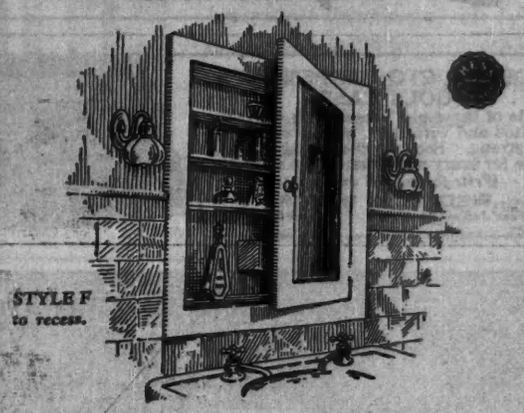
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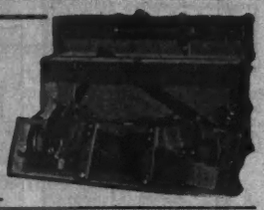
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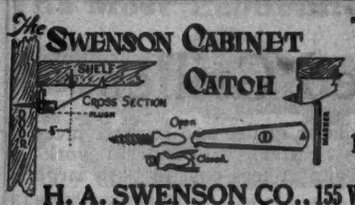
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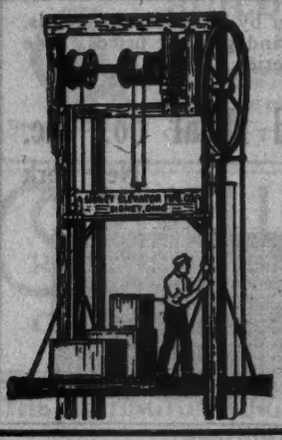
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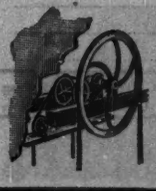
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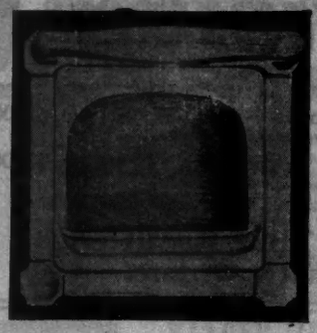
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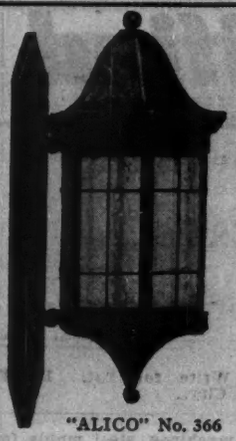
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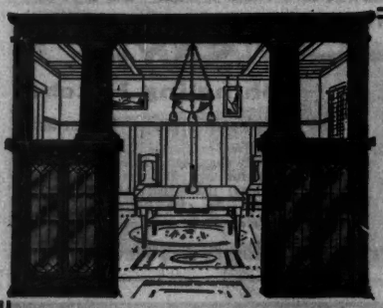
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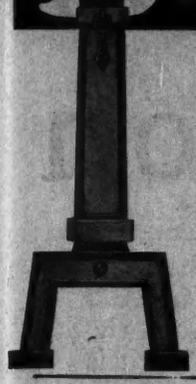


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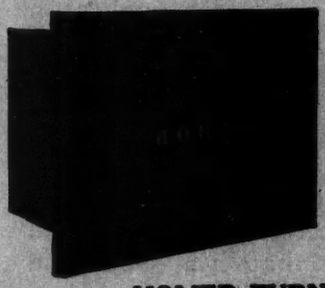
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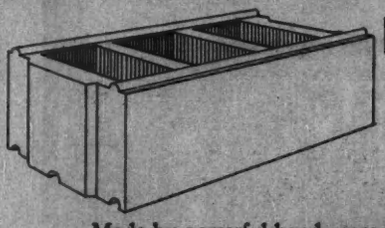
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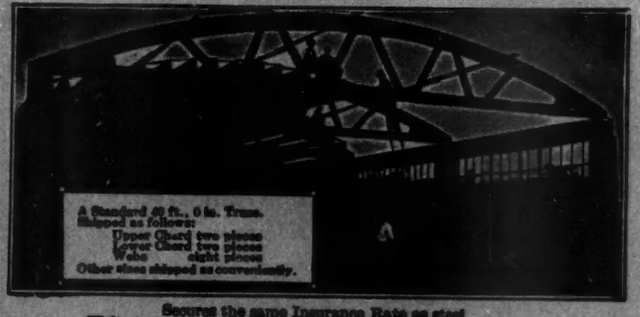
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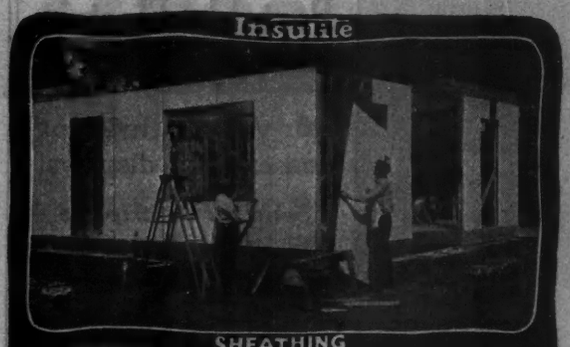
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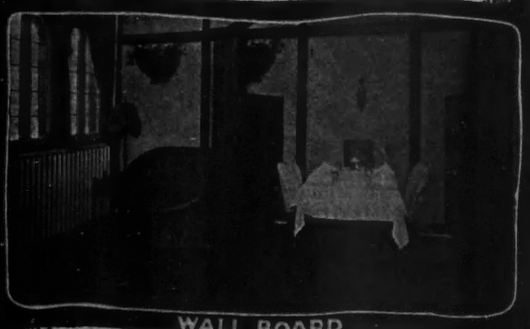
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Builders Exchange Building
Minneapolis, Minn.

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1

CLASSIFIED DIRECTORY AND BUYERS' GUIDE

Listing Reliable, Responsible Manufacturers of All Kinds of Materials, Equipment, Machinery, Fixtures, Home Conveniences and Furnishings, Hardware, Tools, Etc., Used in the Building and Related Fields

And the Page Numbers on Which Their Advertisements Appear

THIS Classified Index and Buyers' Guide is arranged from A to Z according to NOUN names; that is, all kinds of Roofing are in one section in the proper alphabetical place. In the section devoted to Doors you will find lists of over thirty different kinds. Do not look for Screen Doors, but for *Doors—Screen;* if you want to find metal lath, look for *Lath—Metal,* etc.

Under each classification the names of manufacturers appear alphabetically, followed by page number on which their advertisement appears in this issue of the AMERICAN BUILDER.

To find the manufacturer of an article under a special Trade Name or brand look for the Trade Name desired in the alphabetical list immediately following this Classified Index, which is also printed on this green paper.

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J. D. Wallace & Co.....570-571
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Crescent Machine Co.....568-569
DeWalt Products Co.....576-577
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Jones Superior Machine Co.....598
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North Bros. Mfg. Co.....612

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Newark Ladder & Bracket Mfg. Co.....706
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Newark Ladder & Bracket Mfg. Co.....706
Patent Scaffolding Co.....605
Stanley Works.....34-35
Steel Scaffolding Co.....599

BRACKETS—SCAFFOLD
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Newark Ladder & Bracket Mfg. Co.....706
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Associated Tile Mfrs.....449
Central Specialty Mfg. Co.....715
Garden City Plating & Mfg. Co.....707
Greene, Tweed & Co.....712
Griffin Mfg. Co.....691
McKinney Mfg. Co.....48
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American Insulation Co.....427-428-429
Elite Mfg. Co.....614
Newark Ladder & Bracket Mfg. Co.....706
Steel Scaffolding Co.....599

BRACKETS—WALL
American Radiator Co.....106-107-476-477
Art Lantern Importing Co.....715
Crane Company.....154
Elite Mfg. Co.....614
Gabriel Steel Co.....86-87
National Metal Molding Co.....444
Newark Ladder & Bracket Mfg. Co....706
Patent Scaffolding Co.....605
U. S. Radiator Corp.....114

BREAKFAST NOOKS
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Wasmuth-Endicott Co.....178-179
Western Pine Mfrs. Assn.....17

BREAKFAST ROOMS—BUILT-IN
Farley & Loetscher Mfg. Co.....26-453
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17

BRICK—COMMON
Common Brick Mfrs'. Assn. of America.....415-416-417

BRICK—CORK
Armtsrong Cork & Insulation Co.....168

BRICK—FACE
American Face Brick Assn.....452
Hoosier Building Tile & Silo Co....202-203

BRICK—FIRE
W. S. Dickey Clay Mfg. Co.....207

BRICK—RUBBER
Wright Rubber Products Co.....496-497

BRICK MACHINES—CEMENT
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601
Ideal Concrete Machinery Co.....532-533
Raber & Lang Mfg. Co.....554

BRIDGING—FLOOR (Steel)
Blaw-Knox Co.....639
Youngstown Pressed Steel Co.....636-637

BRUSHES—AIR
DeVilbiss Mfg. Co.....616
B. L. Makepeace, Inc.....611

BRUSHES—PAINT
B. L. Makepeace, Inc.....611

BRUSHES—POLISHING
S. C. Johnson & Son.....386-387

BUCKETS—ELEVATOR
Chain Belt Co.....2
Heltzel Steel Form & Iron Co.....621

BUCKETS—HOISTING AND DUMPING
Chain Belt Co.....2
Heltzel Steel Form & Iron Co.....621
Ransome Concrete Machinery Co.....596

BUILDERS HARDWARE—(See Hardware, Various Kinds)

BUILDINGS—PORTABLE
Asbestos Shingle, Slate & Sheathing Co.127
General Fireproofing Building Products Co.....181-688-705
Milwaukee Corrugating Co..759-760-761-762
Patent Scaffolding Co.....605
Togan Stiles, Inc.....32
Truscon Steel Company....64-65-66-67-68-69

BUILDINGS—STEEL
Blaw-Knox Co.....764
Edwards Mfg. Co.....134
General Fireproofing Building Products Co.....181-688-705
International Steel & Iron Co.....640-641
Truscon Steel Co.....64-65-66-67-68-69
Union Metal Mfg. Co.....505

BURNERS—GARBAGE
American Radiator Co.....106-107-476-477
Buffalo Co-Operative Stove Co..... 97
Guardian Gas Appliance Co.....468
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
Kerner Incinerator Co..... 98
L. J. Mueller Furnace Co.....103-104-105
S. Wilks Mfg. Co.....703

BURNERS—RUBBISH
Buffalo Co-Operative Stove Co..... 97
Donley Bros. Co..... 91
Hardin-Lavin Co. 755-756-757-766
Kerner Incinerator Co..... 98
Majestic Company 96
L. J. Mueller Furnace Company.103-104-105
Wickwire-Spencer Steel Co., Inc.....184

BURNISHERS
Henry Disston & Sons.....399

BUTTS—DOOR
Chicago Spring Hinge Co..... 43
Frantz Mfg. Co..... 8
Garden City Plating & Mfg. Co.....707
Greene, Tweed & Co.....712
Griffin Mfg. Co.....691
McKinney Mfg. Co..... 48
National Mfg. Co.....768
Richards-Wilcox Co. 10-11
Sargent & Company.....54-55
Stanley Works 34-35

CABINETS—BATHROOM AND MEDICINE
Frank S. Betz Co.....177
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Hardin-Lavin Co. 755-756-757-766
Hess Warming and Ventilating Co.116-713
Invisibowl Mfg. Corp.....710
The Kawneer Co.....163
The Lima Sheet Metal Products Co.....672
Majestic Steel Cabinet Co.....485
The Ohio State Stove & Mfg. Co....462-463
Morton Mfg. Co..... 79
Paine Lumber Co., Ltd.....19-20-21-22
Albert Pick & Co.....169
Powell, Milton C. & Dwight..... 82
Roberts Sash & Door Co.....751-752-753
"White-Steel" Sanitary Products Co....665

CABINETS—DRESSING ROOM
Curtis Companies Service Bureau..... 18
Gould Mfg. Co..... 23
The Kawneer Co. 163
Majestic Steel Cabinet Co.....485
Henry Weis Mfg. Co.....78
The "White" Door Bed Co.....169

CABINETS—FILING
American Blue Print Paper Co.....621
Continental Steel Products Co..... 80

CABINETS—KITCHEN
Bertelsen Adjustable Grille Co.....715
Frank S. Betz Co.....177
Continental Steel Products Co..... 80
Curtis Companies Service Bureau..... 18
Gould Mfg. Co.....23
Kozy Kitch Kitchenet Co.....701
The Lima Sheet Metal Products Co.....672
Majectic Steel Cabinet Co.....485
The Ohio State Stove & Mfg. Co....462-463
Paine Lumber Co., Ltd.....19-20-21-22
Milton C. & Dwight Powell..... 82
Roberts Sash & Door Co.....751-752-753
G. J. Sellers & Sons Company.....180
Wasmuth-Endicott Co. 178-179
The "White" Door Bed Co.....169

CABINETS—STORAGE
Frank S. Betz Co.....177
Majestic Steel Cabinet Co.....485
G. J. Sellers & Sons Company.....180

CABINETS—TELEPHONE
Majestic Steel Cabinet Co.....485

CABLE—ARMORED
American Steel & Wire Co.....186
General Electric Co. 432-433-434-435-436-437-438-439-440-441
La Plant Choate Mfg. Co.....696

CALCIUM CHLORIDE
The Rocbond Co.....683
Solvay Process Co..... 63

CALIPERS
The L. S. Starrett Co.....602

CANVAS
Wm. L. Barrell Co.....715
John Boyle & Co., Inc.....682
B. L. Makepeace, Inc.....611

CAPITALS—CARVED WOOD
Ornamental Products Co.....714

CAPITALS—TILE
Associated Tile Mfrs.....449

CAPS—CHIMNEY
The Edwards Mfg. Co.....134
Klauer Mfg. Co.....717
Slatington Slate Co.....714
Sterling Foundry Co..... 95

CAPS—POST
Crane Co. 154
Ireland Machine & Foundry Co., Inc....622
Slatington Slate Co.....714

CAPSTANS—HOUSE MOVING
La Plant Choate Mfg. Co.....696
Stimmel Winch & Machine Works.....713

CARPET—CORK
Armstrong Cork Co.....212

CARRIERS—CLAMP
The Donley Bros. Co..... 91
James L. Taylor Mfg. Co.....614

CARRIERS—CLOTHES
Knape & Vogt Mfg. Co.....651

CARRIERS—FEED
Hunt-Helm-Ferris & Co.....39-40-41-42
J. E. Porter Corp..... 50
The Silver Mfg. Co.....610

CARRIERS—HAY
Hunt-Helm-Ferris & Co.....39-40-41-42
F. E. Myers & Bro. Co.....146-147
J. E. Porter Corp..... 50

CARRIERS—LITTER
Hunt-Helm-Ferris & Co.....39-40-41-42
J. E. Porter Corp..... 50

CARRIERS—OVERHEAD
Allith-Prouty Co. 46-47

CARS—ELEVATOR
Highwood Dumbwaiter Co. 704
Logan Co. 696

CARS—INDUSTRIAL
Anchor Concrete Machinery Co.....594

CARTS—CONCRETE
Concrete Equipment Co. 530-531
Sterling Wheelbarrow Co. 552-553
Standard Scale & Supply Corp.....559

CARTS—DUMP
Lansing Co. 548-549

CARTS—HAND
Lansing Co. 548-549

CARVINGS—WOOD
Ornamental Products Co. 714

CASES—TOOL
Wedell & Boers 714

CASES—WALL
Continental Steel Products Co..... 80
Curtis Companies Service Bureau..... 18
Paine Lumber Co., Ltd.....19-20-21-22

CASINGS—WINDOW (Sheet Metal)
Detroit Steel Products Co.....74-75
The Edwards Mfg. Co.....134
The Kawneer Co. 163
Milwaukee Corrugating Co..759-760-761-762
Morton Manufacturing Co. 79
Truscon Steel Co. 64-65-66-67-68-69

CASINGS—WINDOW (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Farley & Loetscher Mfg. Co.....26-453
Hartman-Sanders Co. 28
The Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17

CASTINGS TO ORDER
Allith-Prouty Co. 46-47
Greene, Tweed & Co.....712
International Heater Co.....115
Ireland Machine & Foundry Co., Inc...622
Kwik Mix Concrete Mixer Co.....556
Orr & Sembower, Inc.....610
The Standard Scale & Supply Corp...559
Stewart Mfg. Co. 560-561

CATCHES—CABINET DOOR
H. A. Swenson 714

CATCHES—FRICTION
Hagstrom Mfg. Co. 698

CEILINGS—ASBESTOS WOOD
Asbestos Shingle, Slate & Sheathing Co.127
Johns-Manville, Inc. 401
Sall Mountain Co. 123-124-125-126

CEILINGS—MARBLE
Marietta Mfg. Co. 409
The Vitrolite Co. 158

CEILINGS—METAL
American Sheet & Tin Plate Co.....682
The Edwards Mfg. Co.....134
W. C. Hopson Co.....714
International Steel & Wire Co.....640-641
Klauer Mfg. Co.....717
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co.674
Willis Mfg. Co. 85

CEILINGS—SUSPENDED
The Bostwick Steel Lath Co.....642
Truscon Steel Co. 64-65-66-67-68-69
United States Gypsum Co.....171-653
The Youngstown Pressed Steel Co.636-637

CEILINGS—TILE
Associated Tile Mfrs. 449

CEILINGS—WOOD
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau 18
Hammond Cedar Co., Ltd.....446
The Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17
Wonham, Bates & Goode Trading Corp.413

CEMENT—ASPHALT
Amalgamated Roofing Co. 669
Armstrong Cork & Insulation Co.....168
The Barber Asphalt Co.....482-483
Beckman-Dawson Roofing Co. 132
The Philip Carey Co.....128-129
Certain-teed Products Corp. 515
Logan-Long Co. 133
Sall Mountain Co. 123-124-125-126

CEMENT—BOILER
Armstrong Cork & Insulation Co.....168
Bowman Supply & Mfg. Co., Inc.....699
The Philip Carey Co.....128-129
Certain-teed Products Corp. 515
The Clinton Metallic Paint Co.....405
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
Sall Mountain Co. 123-124-125-126

CEMENT—HIGH TEMPERATURE
Armstrong Cork & Insulation Co.....168
Asbestos Shingle, Slate & Sheathing Co.127
The Philip Carey Co.....128-129
The Clinton Metallic Paint Co.....405
Sall Mountain Co. 123-124-125-126

CEMENT—LINOLEUM
Armstrong Cork Co. 212

CEMENT—MASONS
The Carney Co. 395
Louisville Cement Co. 216

CEMENT—PORTLAND
Alpha Portland Cement Co.....188
The Atlas Portland Cement Assn.....189
Ford Motor Co. 536
Lehigh Portland Cement Co.....191
Louisville Cement Co. 216
Portland Cement Assn. 190
The Sandusky Cement Co.....192
Universal Portland Cement Co.....220

CEMENT—PORTLAND (White)
The Atlas Portland Cement Co.....189
Lehigh Portland Cement Co.....191
The Sandusky Cement Co.....192

CEMENT—ROOFING
Amalgamated Roofing Co. 669
Asbestos Shingle, Slate & Sheathing Co.127
The Barber Asphalt Co.....482-483
The Beaver Products Co., Inc.....494-495
Beckman-Dawson Roofing Co. 132
The Philip Carey Co.....128-129
Certain-teed Products Corp. 515
The Clinton Metallic Paint Co.....405
Feder-Schwartz Process Co. 704
Johns-Manville, Inc. 401
Klauer Mfg. Co. 717
Logan-Long Co. 133
The Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Solvay Process Co. 63
Toch Brothers 711

CHAINS—DOOR
Phenix Mfg. Co. 706

CHAINS—HOISTING
American Chain Co., Inc.....214
La Plant Choate Mfg. Co.....696
Joseph T. Ryerson & Son, Inc.....522

CHAINS—SASH
American Chain Company, Inc.....214
Chain Products Co. 707
Garden City Plating & Mfg. Co.....707
Smith & Egge Mfg. Co.....704

CHAINS—TRANSOM
The H. B. Ives Co.....692
Stanley Works 34-35

CHAIRS—ASSEMBLY SEATING
E. W. A. Rowles Co.....687

CHANNELS—PRESSED STEEL
Bates Expanded Steel Truss Co.....643
Berger Mfg. Co. 185
Consolidated Expanded Metal Co's.....645
The Heltzel Steel Form & Iron Co....621
International Steel & Iron Co....640-641
Milwaukee Corrugating Co..759-760-761-762
Morton Mfg. Co. 79
The Youngstown Pressed Steel Co.636-637

CHANNELS—STEEL
The Bostwick Steel Lath Co.....642
Consolidated Expanded Metal Co's....645
The Heltzel Steel Form & Iron Co....621
Inland Steel Co. 83
International Steel & Iron Co.....640-641
Milwaukee Corrugating Co..759-760-761-762
North Western Expanded Metal Co.638-639
The Sykes Metal Lath Co.....187
The Youngstown Pressed Steel Co.636-637

CHECKS—DOOR
The Caldwell Mfg. Co.....704
Richards-Wilcox 10-11
Frank Rose Mfg. Co..... 45
Sargent & Co. 54-55

CHESTS—CEDAR
Farley & Loetscher Mfg. Co.....26-453
Roberts Sash & Door Co.....751-752-753

CHESTS—ICE
Electric Fireplace Mfg. Co.....443
Gurney Refrigerator Co. 7-145
Herrick Refrigerator & C. S. Co.....144
McCray Refrigerator Co. 142-143
Albert Pick & Co.....169

CHESTS—TOOL
Continental Steel Products Co..... 80
Stanley Works 34-35

CHISELS—CARPENTERS
Stanley Works 34-35
The James Swan Co.....592
The L. & I. J. White Co.....708

CHIPPERS—ROOF
Wm. Eiermann 712

CHISELS—FLOOR
Stanley Works 34-35

CHISELS—HOLLOW MORTISING
American Saw Mill Machinery Co...574-575
The Crescent Machine Co.....568-569
DeWalt Products Co. 576-577
Jones Superior Machine Co.....598
J. D. Wallace & Co.....570-571
Woodworkers Tool Works 615

CHUTES—COAL
H. W. Covert Co.....605
The Donley Bros. Co..... 91
The Edwards Mfg. Co.....134
Gabriel Steel Co. 86-87
International Steel & Iron Co.....640-641
Kewanee Mfg. Co. 92
Klauer Mfg. Co. 717
The Majestic Co. 96
Peerless Mfg. Co. 88-89
The Standard Scale & Supply Corp....559
Sterling Foundry Co. 95
Stover Mfg. & Engine Co.....620
Willis Mfg. Co. 85
The Youngstown Pressed Steel Co..636-637

CHUTES—MAIL
Penn-Greg Mfg. Co. 649

CLAMPS—BRICK
The Donley Bros. Co..... 91

CLAMPS—CARPENTERS
E. C. Atkins & Co.....544
James L. Taylor Mfg. Co.....614

CLAMPS—CHAIN
James L. Taylor Mfg. Co.....614
Woodworkers Tool Works 615

CLAMPS—COLUMN
James L. Taylor Mfg. Co.....614
Woodworkers Tool Works 615

CLAMPS—DOOR
Automatic Tool Co., Inc.....710
James L. Taylor Mfg. Co.....614
Woodworkers Tool Works 615

CLAMPS—FORM
Cincinnati Iron Fence Co.....691

CLAMPS—FURNITURE MAKING
Richards-Wilcox Mfg. Co. 10-11
James L. Taylor Mfg. Co.....614
Woodworkers Tool Works 615

CLAMPS—MITER
James L. Taylor Mfg. Co.....614
Woodworkers Tool Works 615

CLAMPS—PILING
Woodworkers Tool Works 615

CLAMPS—SAW
Henry Disston & Sons.....399
Ralph M. Kennedy 612
Woodworkers Tool Works 615

CLEANERS—CLOSET
Bowman Supply & Mfg. Co., Inc.....699
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211

CLIPS—CEILING (For Metal Lumber)
The Donley Bros. Co..... 91

CLIPS—FLOOR
The Bull Dog Floor Clip Co.....699

CLIPS—GALVANIZED
Asbestos Shingle, Slate & Sheathing Co.127
The Edwards Mfg. Co.....134

CLIPS—SIDING (Metal)
Asbestos Shingle, Slate & Sheathing Co.127
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
F. D. Kees Mfg. Co.....694

CLOCKS
American Clock Co. 668

CLOSETS—CHEMICAL
Bowman Supply & Mfg. Co., Inc.....699
Chemical Toilet Corp. 481
Dail Steel Products Co.....696
Hardin-Lavin Co. 755-756-757-766
Kaustine Co., Inc. 647

CLOSETS—HANGING
Paine Lumber Co., Ltd.....19-20-21-22

CLOSETS—WATER
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc.....699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
Standard Sanitary Mfg. Co.....389

CLOTH—SCREEN
Gilbert & Bennett Mfg. Co.....513
The New Jersey Wire Cloth Co.....488
Spargo Wire Co. 710
Wickwire Spencer Steel Co., Inc.....184

CLOTH—SHADE
E. I. DuPont de Nemours & Co., Inc..174

CLOTH—TRACING
A. S. Aloe Co.....555-585-607
American Blue Print Paper Co.....621
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
Warren-Knight Co. 560

CLOTH—WIRE
Gilbert & Bennett Mfg. Co.....513
The New Jersey Wire Cloth Co.....488
Wickwire Spencer Steel Co., Inc.....184

CLUTCHES—FRICTION
Johns-Manville, Inc. 401

COAL HANDLING MACHINERY
Atlas Engineering Co. 617-620
Chain Belt Co. 2
The Standard Scale & Supply Corp..559

COATINGS—CEMENT
Anti-Hydro Waterproofing Co. 681-684
Certain-teed Products Corp. 515
The B. F. Nelson Mfg. Co.....406
Sall Mountain Co. 123-124-125-126
Toch Brothers Co. 711
Truscon Steel Co. 64-65-66-67-68-69

COATINGS—ROOF
Amalgamated Roofing Co. 669
Beckman-Dawson Roofing Co.....132
Samuel Cabot, Inc. 491
The Philip Carey Co.....128-129
Certain-teed Products Corp. 515
Johns-Manville, Inc. 401
The B. F. Nelson Mfg. Co.....406
Sall Mountain Company ..123-124-125-126
Solvay Process Co. 63
The Sherwin-Williams Co. 393
Toch Brothers 711
The Truscon Laboratories 70-71

COLONNADES
Bertelsen Adjustable Grille Co.....715
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
Roberts Sash & Door Co.....751-752-753

COLORS—BRICK
Samuel Cabot, Inc. 491
The Clinton Metallic Paint Co.....405
Toch Brothers 711
C. K. Williams & Co.....680

COLORS—CEMENT
Samuel Cabot, Inc. 491
The Clinton Metallic Paint Co.....405
The Sherwin-Williams Co. 393
Toch Brothers 711
The Truscon Laboratories 70-71
C. K. Williams & Co.....680

COLORS—MAGNESITE
Samuel Cabot, Inc. 491
The Clinton Metallic Paint Co.....405
Toch Brothers 711
C. K. Williams & Co.....680

COLORS—MORTAR
Samuel Cabot, Inc. 491
The Clinton Metallic Paint Co.....405
Hoosier Building Tile & Silo Co...202-203
The Rocbond Co. 683
Toch Brothers 711
C. K. Williams & Co.....680

COLORS—STUCCO
The Bishopric Mfg. Co.....403-404
Samuel Cabot, Inc. 491
The Clinton Metallic Paint Co.....405
The Rocbond Co. 683
Toch Brothers 711
The Truscon Laboratories 70-71
C. K. Williams & Co.....680

COLUMNS—METAL
The Donley Bros. Co..... 91
The Edwards Mfg. Co.....134
The Union Metal Mfg. Co.....505

COLUMNS—PIPE
The Donley Bros. Co..... 91

COLUMNS—WOOD
Curtis Companies Service Bureau..... 18
Gould Mfg. Co. 23
Hartmann-Sanders Co. 28
E. M. Long & Sons.....31
The Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17

COMPASSES
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
Warren-Knight Co. 560
Wissler Instrument Co. 610

COMPOUNDS—ANTI-FREEZE
Adensite Co., Inc. 710
Anti-Hydro Waterproofing Co. 681-684
Co-Wa-Co., Inc. 715
Feder-Schwartz Process Co.....704
The General Fireproofing Bldg. Products Co. 181-688-705
MacStone Stucco Co., Inc.....694
Toch Brothers 711
The Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69

COMPOUNDS—CALKING
Chamberlin Metal Weatherstrip Co., Inc.138
The Diamond Metal Weatherstrip Co..137
Feder-Schwartz Process Co. 704
Federal Metal Weatherstrip Co.....703
Hardin-Lavin Co. 755-756-757-766
H. B. Fred Kuhls.....685
Toch Brothers 711
The Truscon Laboratories 70-71
Weatherproof Calking Co. 713

COMPOUNDS—GLAZING
The Philip Carey Co.....128-129
H. B. Fred Kuhls.....685
The Sherwin-Williams Co. 393
The Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69

COMPRESSORS—AIR
Novo Engine Co. 604
Spray Painting and Finishing Equip. Sales Co. 708

CONDUCTORS—ARMORED
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441

CONDUITS—ELECTRICAL
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441

CONDUITS—UNDERGROUND
Asbestos Shingle, Slate & Sheathing Co. 127-128
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Johns-Manville, Inc. 401

CONVEYING MACHINERY
Chain Belt Co. 2
Logan Co. 696
Sedgwick Machine Works 670

CONVEYORS—BELT
Atlas Engineering Co. 617-620
Logan Co. 696

CONVEYORS—PORTABLE
Atlas Engineering Co. 617-620
Chain Belt Co. 2
Logan Co. 696
The Standard Scale & Supply Corp....559

COPING—WALL
Clay Products Assn. 688
W. S. Dickey Clay Mfg. Co.....207

COPPER—ROLL
C. G. Hussey & Co..... 77
The Kawneer Co. 163
Manhattan Perforated Metal Co., Inc..713
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co.674
Zouri Drawn Metals Co.....8-9

COPPER—SHEET
The Edwards Mfg. Co.....134
C. G. Hussey & Co..... 77
The Kawneer Co. 163
Klauer Mfg. Co. 717
Manhattan Perforated Metal Co., Inc...713
Milwaukee Corrugating Co..751-752-753-754
The Moeschl Edwards Corrugating Co..674
Zouri Drawn Metals Co.....8-9

COPPER—SOLDERING
C. G. Hussey & Co..... 77

CORD—AWNING
John Boyle & Co., Inc.....682
Samson Cordage Works 708

CORD—DUMBWAITER
John W. Kiesling & Son.....698
Samson Cordage Works 708
Sedgwick Machine Works 670

CORD—SASH
American Steel & Wire Co.....186
Farley & Loetscher Mfg. Co.....26-453
The Hooven & Allison Co.....673
Samson Cordage Works 708
Silver Lake Co. 213
Wickwire Spencer Steel Co., Inc.....184

CORNCRIBS—HOLLOW TILE
Hoosier Building Tile & Silo Co...202-203
National Fire Proofing Co.....205

CORNCRIBS—METAL
The Edwards Mfg. Co.....134
Wheeling Metal & Mfg. Co.....136

CORNERS—METAL
The Donley Bros. Co..... 91
The Edwards Mfg. Co.....134
F. D. Kees Mfg. Co.....694
Klauer Mfg. Co. 717
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co.674
Willis Mfg. Co. 85

CORNICES—METAL
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
Klauer Mfg. Co. 717
Messenger & Parks Mfg. Co.....717
Milwaukee Corrugating Co.759-760-761-762
The Moeschl Edwards Corrugating Co.674
Willis Mfg. Co. 85

COSTUMERS—BATHROOM
"White-Steel" Sanitary Furniture Co..665

COUNTERSINKS
Otis A. Smith Mfg. Co.....712
Stanley Works 34-35

COVERINGS—BOILER AND PIPE
American Insulation Co. 427-428-429
Armstrong Cork & Insulation Co.....168
Asbestos Shingle, Slate & Sheathing Co.127
The Philip Carey Co.....128-129
Hardin-Lavin Co. 755-756-757-766
Johns-Manville, Inc. 401
B. Karol & Sons Co.....210-211
L. J. Mueller Furnace Co.....103-104-105
Sall Mountain Co. 123-124-125-126
U. S. Radiator Corp.....114

COVERINGS—COLUMN AND GIRDER
Consolidated Expanded Metal Co's.....645
National Fire Proofing Co.....205

COVERINGS—FLOOR (Linoleum)
Armstrong Cork Co. 212
Armstrong Cork & Insulation Co.....168
Certain-teed Products Corp 515
The Marietta Mfg. Co.....409
Albert Pick & Co.....169

COVERINGS—WALL
Associated Tile Mfrs. 449
The Marietta Mfg. Co.....409
The Moeschl Edwards Corrugating Co.674
Morene Products Co.....172
The Standard Textile Products Co.....173
The Vitrolite Co. 158

COVERINGS—WATERPROOF
The Barber Asphalt Co.....482-483
The Philip Carey Co.....128-129
Feder-Schwartz Process Co.....704
Solvay Process Co. 71

COVERS—CISTERN
The Donley Bros. Co..... 91
Frantz Mfg. Co. 3
Hardin-Lavin Co. 755-756-757-766
International Steel & Iron Co.....640-641
Klauer Mfg. Co. 717
The Majectic Co. 96
Sterling Foundry Co. 95

COVERS—COALHOLE
The Donley Bros. Co..... 91
Frantz Mfg. Co. 3
International Steel & Iron Co.....640-641
Ireland Machine & Foundry Co., Inc..622
Klauer Mfg. Co. 717
Sterling Foundry Co. 95

COVERS—MANHOLE
The Donley Bros. Co..... 91
Frantz Mfg. Co. 3
Hardin-Lavin Co. 755-756-757-766
International Steel & Iron Co.....640-641
Ireland Machine & Foundry Co., Inc..622
B. Karol & Sons Co.....210-211
Klauer Mfg. Co. 717
Sterling Foundry Co. 95
The Youngstown Pressed Steel Co..636-637

COVERS—RADIATOR
American Radiator Co. 106-107-476-477
Frank S. Bets Co.....177
Schleicher, Inc. 500-501
The Vitrolite Co. 158

CRANES—GASOLINE
Koehring Co. 563

CRANES—HAND
Richards-Wilcox Mfg. Co.....10-11
Sedgwick Machine Works.....670

CRAYONS—LUMBER
A. S. Aloe Co.....555-585-607
New York Blue Print Paper Co.....699
Warren-Knight Co. 560

CUPOLAS—BARN
Hunt-Helm-Ferris & Co.....39-40-41-42
Klauer Mfg. Co. 717
Manhattan Perforated Metal Co., Inc..713
Milwaukee Corrugating Co..759-760-761-762
J. E. Porter Corp..... 50
Willis Mfg. Co. 85

CULVERTS—PIPE (Vitrified)
W. S. Dickey Clay Mfg. Co.....207

CULVERTS—SEGMENT BLOCKS (Vitrified)
W. S. Dickey Clay Mfg. Co.....207

CURTAINS——ASBESTOS
Asbestos Shingle, Slate & Sheathing Co.127
Johns-Manville, Inc. 401

CURTAINS—METAL
The Moeschl Edwards Corrugating Co..674

CUT-OUTS—ELECTRICAL
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441

CUTTERS—ASBESTOS SHINGLE
Ajax Building Bracket Co.....470

CUTTERS—BAR
Koehring Co. 563
Joseph T. Ryerson & Son, Inc.....522

CUTTERS—DADO
Huther Bros. Saw Mfg. Co.....580
Ralph M. Kennedy 612

CUTTERS—MITER
The Kawneer Co. 163
Woodworkers Tool Works 615

CUTTERS—MOULDING
Ralph M. Kennedy 612

CUTTERS—SASH
Woodworkers Tool Works 615

CUTTERS—SLATE
Ajax Building Bracket Co.....470

CUTTERS—WASHER
Otis A. Smith Mfg. Co.....712

CYCLOPEDIAS—BUILDING
Radford Architectural Co...119-120-121-122

DAMPERS—FIREPLACE
Colonial Fireplace Co. 90
H. W. Covert Co. 695
The Donley Bros. Co..... 91
Gabriel Steel Co. 86-87
Hornet Mantel & Tile Co..... 93
International Steel & Iron Co.....640-641
Ireland Machine & Foundry Co., Inc..622
Klauer Mfg. Co. 717
The Majestic Company 96
The Ohio Foundry & Mfg. Co..... 95
Peerless Mfg. Co. 88-89
Pioneer Fireplace Co. 676
The Sykes Metal Lath Co.....187
Willis Mfg. Co. 85

DAMPPROOFING
Adensite Co., Inc. 710
Anti-Hydro Waterproofing Co. 681-684
The Barber Asphalt Co.....482-483
Beckman-Dawson Roofing Co. 132
Samuel Cabot, Inc. 491
The Philip Carey Co.....128-129
Certain-teed Products Corp. 515
The Donley Bros. Co..... 91
Feder-Schwartz Process Co.....704
The General Fireproofing Bldg. Products Co. 181-688-705
Johns-Manville, Inc. 401
Lincoln-Schlueter Mach. Co., Inc.....584
The B. F. Nelson Mfg. Co.....406
The Richardson Co. 423-424
Solvay Process Co. 63
The Sherwin-Williams Co. 393
Stover Mfg. & Engine Co.....620
Toch Brothers 711
The Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69

DASH—CONCRETE FACING
The Vicro Corporation 195

DASH—STUCCO
Flint Rock Stucco Co.....199
Vicro Corporation 195

DEADENERS—SOUND
Airinsulate Co. 218
Armstrong Cork & Insulation Co.....168
Samuel Cabot, Inc. 497
The Philip Carey Co.....128-129
The Celotex Co. 391
Certain-teed Products Corp. 515
Insulite Co. 718
Johns-Manville, Inc. 401
The B. F. Nelson Mfg. Co.....406
United States Gypsum Co.....171-653
U. S. Mineral Wool Co.....166
Universal Gypsum Co. 661

DECORATIONS—GARDEN AND LAWN
Art Lantern Importing Co.....715
Hammond Cedar Co., Ltd.....446
The Union Metal Mfg. Co.....505

DERRICKS
Kalamazoo Tank & Silo Co.....201
Sasgen Derrick Co. 543
The Standard Scale & Supply Corp....559

DIALS—SUN
A. S. Aloe Company.....555-585-607
Eugene Dietzgen Co. 600
Geier & Bluhm, Inc.....617
Warren-Knight Co. 560

DIVIDERS
A. S. Aloe Co.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
The L. S. Starrett Co.....602
Warren-Knight Co. 560

DOORS—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co.127

DOORS—ASHPIT
H. W. Covert Co.....695
The Donley Bros. Co..... 91
Gabriel Steel Co. 86-87
Hardin-Lavin Co. 755-756-757-766
The Henry Furnace & Fdry. Co.....113
Hornet Mantel & Tile Co..... 93
International Steel & Iron Co.....640-641
Klauer Mfg. Co. 717
Logan Co. 696
The Majestic Co. 96
Peerless Mfg. Co. 88-89
A. L. Swett Iron Works.....677
The Sykes Metal Lath Co.....187

DOORS—BRONZE
Cornell Iron Works, Inc.....712
The Kawneer Co. 163
David Lupton's Sons Co..... 76
Logan Co. 696

DOORS—CELLAR (Metal)
Cincinnati Iron Fence Co.....691
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
Logan Co. 696
Truscon Steel Co. 64-65-66-67-68-69

DOORS—CLEANOUT
The Donley Bros. Co..... 91
Gabriel Steel Co. 86-87
Hardin-Lavin Co. 755-756-757-766
Homer Furnace Co. 717
Hornet Mantel & Tile Co..... 93
International Steel & Iron Co.....640-641
Klauer Mfg. Co. 717
Logan Co. 696
The Majestic Co. 96
The Ohio Foundry & Mfg. Co..... 94
Peerless Mfg. Co. 88-89
Sterling Fdry. Co. 95
The Sykes Metal Lath Co.....187

DOORS—COAL
The Youngstown Pressed Steel Co...636-637

DOORS—COPPER COVERED
Brasco Mfg. Co. 161
The Coburn Trolley Track Mfg. Co.... 49
The Edwards Mfg. Co.....134
The Kawneer Co. 163
The Moeschl Edwards Corrugating Co.674
Zouri Drawn Metals Co.....8-9

DOORS—DUMP
H. W. Covert Co.....695
Peerless Mfg. Co. 88-89
The Sykes Metal Lath Co.....187

DOORS—ELEVATOR
Cincinnati Iron Fence Co.....691
The Coburn Trolley Track Mfg. Co.... 49
Cornell Iron Works, Inc.....712
Logan Co. 696
The Moeschl Edwards Corrugating Co.674
Truscon Steel Co. 64-65-66-67-68-69

DOORS—FIRE
American Sheet & Tin Plate Co.....682
Cincinnati Iron Fence Co.....691
The Coburn Trolley Track Mfg. Co.... 49
Cornell Iron Works, Inc.....712
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co.674
Richards-Wilcox Mfg. Co.....10-11
Truscon Steel Co. 64-65-66-67-68-69
Willis Mfg. Co. 85

DOORS—FIREPROOF (Hollow Metal)
The Edwards Mfg. Co.....134
The General Fireproofing Bldg. Pdts. Co. 181-688-705
The Kawneer Co.....163
The Moeschl Edwards Corrugating Co.674
Morton Mfg. Co. 79
Richards-Wilcox Mfg. Co.....10-11
Truscon Steel Co. 64-65-66-67-68-69

DOORS—FIREPROOF (Metal Covered)
The Coburn Trolley Track Mfg. Co.... 49
The Edwards Mfg. Co.....134
The General Fireproofing Bldg. Pdts. Co. 181-688-705
Richards-Wilcox Mfg. Co. 10-11
Truscon Steel Co. 64-65-66-67-68-69
Western Pine Mfrs. Assn..... 17
Henry Weis Mfg. Co..... 78

DOORS—FOLDING
Cincinnati Iron Fence Co.....691
Logan Co. 696
The Moeschl Edwards Corrugating Co.674
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Truscon Steel Co. 64-65-66-67-68-69

DOORS—GARAGE (Metal)
Cornell Iron Works, Inc.....712
The Edwards Mfg. Co.....134
David Lupton's Sons Co..... 76
Milwaukee Corrugating Co.759-760-761-762
The Moeschl Edwards Corrugating Co.674
Truscon Steel Co. 64-65-66-67-68-69

DOORS—GARAGE (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
Hartman-Sanders Co. 28
Hoosier Building Tile & Silo Co....202-203
E. M. Long & Sons..... 31
The Long-Bell Lbr. Co..... 30
International Steel & Iron Co.....640-641
Overhead Door Corp. 52
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Truscon Steel Co. 64-65-66-67-68-69
Western Pine Mfrs. Assn..... 17
The Wheeler Osgood Co.....175-176

DOORS—HARDWOOD AND VENEERED
Birch Mfrs. 680
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
The Kawneer Co. 163
E. M. Long & Sons 31
The Long-Bell Lbr. Co..... 30
Paine Lbr. Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Roddis Lumber & Veneer Co.....60-61
Wheeler Osgood Co. 175-176
Henry Weis Mfg. Co..... 78

DOORS—IRON AND STEEL
The William Bayley Co..... 73
Cincinnati Iron Fence Co.....691
The Edwards Mfg. Co.....134
The Heltzel Steel Form & Iron Co....621
International Steel & Iron Co.....640-641
Logan Co. 696
David Lupton's Sons Co..... 76
The Moeschl Edwards Corrugating Co.674
Morton Mfg. Co. 79
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co.....636-637

DOORS—KALAMEIN
The Coburn Trolley Track Mfg. Co.... 49
The Edwards Mfg. Co.....134
The Moeschl Edwards Corrugating Co.674

DOORS—ROLLING (Steel)
Cornell Iron Works, Inc.....712
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
The Moeschl Edwards Corrugating Co.674

DOORS—SCREEN
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
The Long-Bell Lbr. Co..... 30
Paine Lumber Co., Ltd 19-20-21-22
Phenix Mfg. Co. 706
Roberts Sash & Door Co.....751-752-753

DOORS—SCREEN AND STORM (Combination)
The Combination Door Co.....715
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
The Long-Bell Lbr. Co..... 30
Paine Lumber Co., Ltd 19-20-21-22
Phenix Mfg. Co. 706
Roberts Sash & Door Co.....751-752-753

DOORS—SHOWCASE
Zouri Drawn Metals Co.....8-9

DOORS—SIDEWALK
Cincinnati Iron Fence Co.....691
International Steel & Iron Co.....640-641
Logan Co. 696

DOORS—SILO
Anchor Concrete Machinery Co.....594
Hoosier Building Tile & Silo Co...202-203
Kalamazoo Tank & Silo Co.....201
Northfield Iron Co. 712

DOORS—SLIDING
California White & Sugar Pine Mfrs. Assn. 27
Cincinnati Iron Fence Co.....691
Farley & Loetscher Mfg. Co.....26-453
The Long-Bell Lbr. Co. 30
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Truscon Steel Co. 64-65-66-67-68-69

DOORS—SOFTWOOD
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
E. M. Long & Sons..... 31
The Long-Bell Lbr. Co..... 30
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17
Wheeler Osgood Co. 175-176

DOORS—STEEL
Henry Weis Mfg. Co..... 78

DOORS—STORM
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23

DOORS—STORM
The Long-Bell Lbr. Co..... 30
Paine Lumber Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753

DOORS—TINCLAD
The Coburn Trolley Track Mfg. Co.... 49
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
The Moeschl Edwards Corrugating Co.674
Richards-Wilcox Mfg. Co. 10-11
Willis Mfg. Co. 85

DOORS—WIRE
Logan Co. 696

DRAIN TILE MACHINES
Concrete Equipment Co. 530-531
The J. B. Foote Foundry Co.....601
Wickwire Spencer Steel Co., Inc.....184

DRAINERS—CELLAR
Bowman Supply & Mfg. Co., Inc.....699
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
Penberthy Injector Co. 490

DRAINERS—FLOOR
Bowman Supply & Mfg. Co., Inc.....699
The Donley Bros. Co..... 91
Hardin-Lavin Co. 755-756-757-766

DRILLING MACHINERY
W. F. & John Barnes Co.....620
Joseph T. Ryerson & Son, Inc.....522
The Silver Mfg. Co.....610
Woodworkers Tool Works 615

DRILLS—BENCH
W. F. & John Barnes Co.....620
W. B. & J. E. Boice.....622
North Bros. Mfg. Co.....612
Joseph T. Ryerson & Son, Inc.....522
Woodworkers Tool Works 615

DRILLS—BREAST
Electro-Magnetic Tool 560
North Bros. Mfg. Co.....612
Stanley Works 34-35

DRILLS—CHAIN
North Bros. Mfg. Co.....612

DRILLS—ELECTRIC
Electro-Magnetic Tool Co. 560
Joseph T. Ryerson & Son, Inc.....522
Wodack Electric Tool Corp.....622-708

DRILLS—HAND
North Bros. Mfg. Co.....612
Stanley Works 34-35

DRILLS—STONE
Ackerman-Johnson Co. 684
Electro-Magnetic Tool Co. 560
North Bros. Mfg. Co.....612
Syntron Co. 619
Wodack Electric Tool Corp.....622-708

DRILLS—TWIST
Joseph T. Ryerson & Son, Inc.....522
The James Swan Co.....592

DRYERS—CLOTHES
American Gas Association.....457
Butler Laboratories, Inc. 673

DRYERS—LAUNDRY
Butler Laboratories, Inc. 673
Sall Mountain Co. 123-124-125-126

DUMBWAITERS
Farley & Loetscher Mfg. Co.....26-453
Highwood Dumbwaiter Co. 704
International Steel & Iron Co.....640-641
John W. Kiesling & Son, Inc.....698
Kimball Brothers Co. 690
Sedgwick Machine Works 670
Sidney Elevator Mfg. Co.....714
Storm Mfg. Co. 714

DUMPS—ASH
H. W. Covert Co.....695
The Donley Bros. Co..... 91
Gabriel Steel Co.....86-87
Klauer Mfg. Co. 717
The Majestic Co..... 96
The Ohio Foundry & Mfg. Co..... 94
Peerless Mfg. Co. 88-89
Sterling Foundry Co..... 95
A. L. Swett Iron Works.....677
The Sykes Metal Lath Co.....187

EAVES TROUGH
The Edwards Mfg. Co.....134
C. G. Hussey & Co..... 77
Klauer Mfg. Co.....717
Messenger & Parks Mfg. Co.....717
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co..674
The New Jersey Zinc Sales Co., Inc.....420
Wheeling Metal & Mfg. Co.....136

EDGERS—GANGSAW
American Saw Mill Machinery Co...574-575
E. C. Atkins & Co.....544
Woodworkers Tool Works.....615

ELBOWS—COPPER
The Edwards Mfg. Co.....134
C. G. Hussey & Co..... 77
Klauer Mfg. Co.....717
David Lupton's Sons Co..... 76
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co..674

ELBOWS—SHEET METAL
The Edwards Mfg. Co.....134
B. Karol & Sons Co.....210-211
Klauer Mfg. Co.....717
David Lupton's Sons Co..... 76
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co..674
L. J. Mueller Furnace Co.....103-104-105
The New Jersey Zinc Sales Co., Inc....420
Wheeling Metal & Mfg. Co.....136

ELEVATING MACHINERY
The Atlas Engineering Co.....617-620
Chain Belt Co..... 2
Kiesling & Son.....698
Kimball Brothers Co.....690
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714

ELEVATORS—BUILDING MATERIAL
Anchor Concrete Machinery Co.....594
Sidney Elevator Mfg. Co.....714
The Standard Scale & Supply Corp.....559

ELEVATORS—ELECTRIC
Kimball Brothers Co.....690

ELEVATORS—FREIGHT AND PASSENGER
Highwood Dumbwaiter Co.....704
International Steel & Iron Co.....640-641
Kiesling & Son.....698
Kimball Brothers Co.....690
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714
The Storm Mfg. Co.....714

ELEVATORS—GARAGE
Highwood Dumbwaiter Co.....704
Kimball Brothers Co.....690
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714
The Storm Mfg. Co.....714

ELEVATORS—HAND
Highwood Dumbwaiter Co.....704
Kiesling & Son.....698
Kimball Brothers Co.....690
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714
The Storm Mfg. Co.....714

ELEVATORS—PORTABLE
Chain Belt Co..... 2
Sidney Elevator Mfg. Co.....714

ELEVATORS—PUSH BUTTON
Highwood Dumbwaiter Co.....704
Kimball Brothers.....690
Sidney Elevator Mfg. Co.....714
The Storm Mfg. Co.....714

ELEVATORS—SIDEWALK
Highwood Dumbwaiter Co.....704
Kimball Brothers Co.....690
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714

ELEXITS
General Electric Co.....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

ENAMELS—ARCHITECTURAL
The Beaver Products Co., Inc.....494-495
Certain-teed Products Corp.....515
Feder-Schwartz Process Co.....704
S. C. Johnson & Son.....386-387
The Sherwin-Williams Co.....393
Toch Brothers 711
The Truscon Laboratories.....70-71

ENCLOSURES—ELEVATOR
Asbestos Shingle, Slate & Sheathing Co.127
Logan Co. 696
Morton Mfg. Co..... 79

ENCLOSURES—PORCH
Thos. J. Malia Co.....698

ENCLOSURES—RADIATOR
Schleicher, Inc. 500-501

ENTRANCES—HOUSE
Hartmann-Sanders Co. 18

ENGINES—GAS
American Saw Mill Machinery Co...574-575
Combination Woodworking Machine Co.587
Fuller & Johnson Mfg. Co.....620
Ralph M. Kennedy.....612
Novo Engine Co.....604
The Standard Scale & Supply Corp.....559
Stover Mfg. & Engine Co.....620

ENGINES—KEROSENE
Fuller & Johnson Mfg. Co.....620
International Harvester Co.....535
Novo Engine Co.....604

EQUIPMENT—AIR PAINTING
Binks Spray Equipment Co.....588
The DeVilbiss Mfg. Co.....616
Spray-Lac Mfg. Co.....567
Spray Painting Equipment Co.....708

EQUIPMENT—BARN
Allith-Prouty Co. 46-47
Hunt-Helm-Ferris & Co.....39-40-41-42
J. E. Porter Corp..... 50
Richards-Wilcox Mfg. Co.....10-11
Wagner Mfg. Co..... 53

EQUIPMENT—CAFETERIA
Garden City Plating & Mfg. Co.....707
Albert Pick & Co.....158
The Vitrolite Co.....158

EQUIPMENT—CONCERE CHUTING
Ransome Concrete Machinery Co.....596

EQUIPMENT—HOGHOUSE
J. E. Porter Corp..... 50

EQUIPMENT—HOTEL
Garden City Plating & Mfg. Co.....707
Albert Pick & Co.....169
The Vitrolite Co.....158

EQUIPMENT—LUNCHROOM
Garden City Plating & Mfg. Co.....707
Albert Pick & Co.....169
The Vitrolite Co.....158

EQUIPMENT—RESTAURANT
Albert Pick & Co.....169
The Vitrolite Co.....158

EQUIPMENT—SCHOOL
American Saw Mill Machinery Co...574-575
Garden City Plating & Mfg. Co.....707
Richards-Wilcox Mfg. Co.....10-11
E. W. A. Rowles Co.....687
The Vitrolite Co.....158
Warren-Knight Co.....560
Woodworkers Tool Works.....615

EQUIPMENT—SEWAGE DISPOSAL
Chemical Toilet Corp.....481
Dail Steel Products Co.....698

EQUIPMENT—SPRAY PAINTING
Binks Spray Equipment Co.....588
The DeVilbiss Mfg. Co.....616
Spray-Lac Mfg. Co.....567
Spray Painting Equipment Co.....708

EXPANDED METAL
Bates Expanded Steel Truss Co.....643
The Bostwick Steel Lath Co.....642
Consolidated Expanded Metal Co's.....645
The Edwards Mfg. Co.....134
The General Fireproofing Building Products Co. 181-688-705
C. G. Hussey & Co..... 77
International Steel & Iron Co.....640-641
Milwaukee Corrugating Co..759-760-761-762
North Western Expanded Metal Co.638-639
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co.....64-65-66-67-68-69
The Youngstown Pressed Steel Co..636-637

FAIENCE—TILE
Associated Tile Mfrs.....449

FANS—ELECTRIC
Century Electric Co.....690

FASTENERS—CASEMENT WINDOW
The Caldwell Mfg. Co.....704
Casement Hardware Co..... 38
Greene-Tweed & Co.....712
Griffin Mfg. Co.....691
The H. B. Ives Co.....692
The Kawneer Co.....163
The Lyons Mfg. Co.....675
Milwaukee Corrugating Co..759-760-761-762
National Brass Co.....678
Sargent & Co.....54-55
Stanley Works 34-35
Truscon Steel Co.....64-65-66-67-68-69

FASTENERS—SCREEN
The Casement Hardware Co..... 38
Farley & Loetscher Mfg. Co.....26-453
Frants Mfg. Co..... 3
Greene-Tweed & Co.....712
F. D. Kees Mfg. Co.....694
McKinney Mfg. Co..... 48
National Brass Co.....678
Phenix Mfg. Co.....706
Sargent & Co.....54-55
Stanley Works 34-35

FASTENERS—STORM SASH
Farley & Loetscher Mfg. Co.....26-453
Frants Mfg. Co.....2
F. D. Kees Mfg. Co.....694
McKinney Mfg. Co.....48
Phenix Mfg. Co.....706
Stanley Works.....34-35

FASTENERS—WALLBOARD
The Upson Co.....502-503

FAUCETS
Bowman Supply & Mfg. Co., Inc.....699
The Chicago Faucet Co.....153
Crane Co.....154
Hardin-Lavin Co.....755-756-757-766
B. Karol & Sons Co.....210-211
Mueller Co.....156
Republic Brass Co.....510-511
Stanley Plumbing Supply Co., Inc.....703

FELTS—ASPHALT
The Barber Asphalt Co.....482-483
The Beaver Products Co., Inc.....494-495
Beckman-Dawson Roofing Co.....132
The Philip Carey Co.....128-129
Certain-teed Products Corp.....515
The Chatfield Mfg. Co.....157
Logan-Long Co.....133
B. F. Nelson Mfg. Co.....406
The Ruberoid Co.....486-487
Sall Mountain Co.....123-124-125-126

FELTS—ASPHALT (Saturated)
The Barber Asphalt Co.....482-483
The Beaver Products Co., Inc.....494-495
Beckman-Dawson Roofing Co.....132
The Philip Carey Co.....128-129
Certain-teed Products Corp.....515
The Chatfield Mfg. Co.....157
Farley & Loetscher Mfg. Co.....26-453
Johns-Manville, Inc.....401
Logan-Long Co.....133
The Richardson Co.....423-424
The Ruberoid Co.....486-487
Sall Mountain Co.....123-124-125-126

FELTS—DEADENING
The Barber Asphalt Co.....482-483
The Beaver Products Co., Inc.....494-495
Beckman-Dawson Roofing Co.....132
Samuel Cabot, Inc.....491
The Philip Carey Co.....128-129
Certain-teed Products Corp.....515
The Chatfield Mfg. Co.....157
Farley & Loetscher Mfg. Co.....26-453
Johns-Manville, Inc.....401
Logan-Long Co.....133
The B. F. Nelson Mfg. Co.....406
The Richardson Co.....423-424
The Ruberoid Co.....486-487
Sall Mountain Co.....123-124-125-126

FELTS—INSULATING
The Barger Asphalt Co.....482-483
The Beaver Products Co., Inc.....494-495
Samuel Cabot, Inc.....491
The Philip Carey Co.....128-129
Certain-teed Products Corp.....515
Farley & Loetscher Mfg. Co.....26-453
Johns-Manville, Inc.....401
Logan-Long Co.....133
The Ruberoid Co.....486-487
Sall Mountain Co.....123-124-125-126

FELTS—TARRED
Beckman-Dawson Roofing Co.....132
The Philip Carey Co.....128-129
Certain-teed Products Corp.....515
The Chatfield Mfg. Co.....157
Farley & Loetscher Mfg. Co.....26-453
The B. F. Nelson Mfg. Co.....406
The Ruberoid Co.....486-487
Sall Mountain Co.....123-124-125-126

FENCES—IRON & STEEL
Cincinnati Iron Fence Co.....691
The Edwards Mfg. Co.....134
Kwik Mix Concrete Mixer Co.....556
Logan Co.....696
Wickwire Spencer Steel Co., Inc.....184

FENCES—LATTICE
Logan Co.....696
Western Pine Mfrs. Assn.....17

FENCES—WOVEN WIRE
American Steel & Wire Co.....186
The New Jersey Wire Cloth Co.....488
Wickwire Spencer Steel Co., Inc.....184

FILERS—SAW
E. C. Atkins & Co.....544
Foley Saw Tool Co.....545
Ralph M. Kennedy.....612
Woodworkers Tool Works.....615

FILES AND RASPS
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Ralph M. Kennedy.....612

FILLERS—CEMENT
Toch Brothers.....711

FILLERS—PAINT
Certain-teed Products Corp.....515
The Martin-Senour Co.....767
The Sherwin-Williams Co.....393
Toch Brothers.....711

FILLERS—RAIL (Asphaltic)
The Philip Carey Co.....128-129

FILLERS—WOOD
Certain-teed Products Corp.....515
S. C. Johnson & Son.....386-387
The Martin-Senour Co.....767
The Sherwin-Williams Co.....393

FILLETS—STAIR RAIL
Farley & Loetscher Mfg. Co.....26-453

FILLING STATIONS
The Union Metal Mfg. Co.....505

FILTERS—WATER
The Structural Slate Co.....62

FINISH—FLOOR
Associated Tile Mfrs.....449
Certain-teed Products Corp.....515
S. C. Johnson & Son.....386-387
The Martin-Senour Co.....767
The Sherwin-Williams Co.....393
Toch Brothers.....711
The Truscon Laboratories.....70-71

FINISH—WALL
Associated Tile Mfrs.....449
The Bishopric Mfg. Co.....403-404
Certain-teed Products Corp.....515
S. C. Johnson & Son.....386-387
The Martin-Senour Co.....767
Morene Products Co.....172
The Sherwin-Williams Co.....393
Toch Brothers.....711
The Truscon Laboratories.....70-71
U. S. Gypsum Co.....171-653
The Woodville Lime Products Co.....419

FIRE ESCAPES
Logan Co.....696

FIREPLACES
Colonial Fireplace Co.....90
H. W. Covert Co.....695
The Donley Bros. Co.....91
Electric Fireplace Mfg. Co.....443
Guardian Gas Appliance Co.....468
Hornet Mantel & Tile Co.....93
Klauer Mfg. Co.....717
The Ohio Foundry & Mfg. Co.....94
Peerless Mfg. Co.....88-89
Pioneer Fireplace Co.....676

FIREPROOFING—HOLLOW TILE
Certain-teed Products Corp.....515
National Fire Proofing Co.....205
Truscon Steel Co.....64-65-66-67-68-69
U. S. Gypsum Co.....171-653

FIREPROOFING METAL LATH
The Youngstown Pressed Steel Co...636-637

FITTINGS—ELECTRICAL CONDUIT
General Electric Co.....432-433-434-435-436-437-438-439-440-441
National Metal Molding Co.....444

FITTINGS—PIPE
Bowman Supply & Mfg. Co., Inc.....699
Crane Co.....154
W. S. Dickey Clay Mfg. Co.....207
Garden City Plating & Mfg. Co.....707
Hardin-Lavin Co.....755-756-757-766
B. Karol & Sons Co.....210-211
Stanley Plumbing Supply Co., Inc.....703

FITTINGS—TOILET
Bowman Supply & Mfg. Co., Inc.....699
Central Specialty Mfg. Co.....715
Chicago Spring Hinge Co.....43
Crane Co.....154
A. F. Curtin Valve Co.....705
Hardin-Lavin Co.....755-756-757-766
Stanley Plumbing Supply Co., Inc.....703
The Structural Slate Co.....62

FIXTURES—BANK
Chicago Spring Hinge Co.....43
Garden City Plating & Mfg. Co.....707
Greene, Tweed & Co.....712
The Vitrolite Co.....158

FIXTURES—BATHROOM
Andrews Heating Co.....715
J. H. Balmer Co.....675
Bowman Supply & Mfg. Co., Inc.....699
Central Specialty Mfg. Co.....715
Crane Co.....154
Hardin-Lavin Co.....755-756-757-766
Hornet Mantel & Tile Co.....93
Invisibowl Mfg. Corp.....710
B. Karol & Sons Co.....210-211
The Kenney-Cutting Products Corp.....693
McGill Mfg. Co.....447
Morton Mfg. Co.....79
Mueller Co.....156
Republic Brass Co.....510-511
Standard Sanitary Mfg. Co.....389
Stanley Plumbing Supply Co., Inc.....703
Wheeling Sanitary Mfg. Co.....155
The "White" Door Bed Co.....169

FIXTURES—CLOTHES CLOSET
Garden City Plating & Mfg. Co.....707
Knape & Vogt Mfg. Co.....651

FIXTURES—ELEVATOR
Richards-Wilcox Mfg. Co.....10-11
Sedgwick Machine Works.....670

FIXTURES—LIGHTING
Art Lantern Importing Co.....715
Copper & Brass Research Assn.....478
Erie Fixture Supply Co.....704
Garden City Plating & Mfg. Co.....707
Paramount Electric Co.....716

FIXTURES—PLUMBING
Bowman Supply & Mfg. Co., Inc.....699
Crane Co.....154
A. F. Curtin Valve Co.....705
Hardin-Lavin Co.....755-756-757-766
Invisibowl Mfg. Corp.....710
B. Karol & Sons Co.....210-211
The Kenney-Cutting Products Corp.....693
Morton Mfg. Co.....79
Mueller Co.....156
Republic Brass Co.....510-511
Standard Sanitary Mfg. Co.....389
Stanley Plumbing Supply Co., Inc.....703
Wheeling Sanitary Mfg. Co.....155

FIXTURES—SCAFFOLD BRACKET
The Patent Scaffolding Co.....605
Richards-Wilcox Mfg. Co.....10-11

FIXTURES—STABLE
Hunt, Helm, Ferris & Co.....39-40-41-42
J. E. Porter Corp.....50

FIXTURES—STORE
Garden City Plating & Mfg. Co.....707
Greene, Tweed & Co.....712
David Lupton's Sons Co.....76
Albert Pick & Co.....160
The Vitrolite Co.....158

FIXTURES—WARDROBE
Garden City Plating & Mfg. Co.....707
Greene, Tweed & Co.....712
McCabe Hanger Mfg. Co.....685
The "White" Door Bed Co.....169

FLAGGING—SLATE
Slatington Slate Co.....714
The Structural Slate Co.....62
Vendor Slate Co., Inc.....489
J. W. Williams Slate Co.....686

FLAGPOLES
Cincinnati Iron Fence Co.....691
Logan Co.....696
The Patent Scaffolding Co.....605
The Pole & Tube Works, Inc.....711
E. W. A. Rowles Co.....687
Wissler Instrument Co.....610

FLOOR POLISHING MACHINES
The American Floor Surfacing Machine Co.....475
Campbell Machine Co.....600
Electric Rotary Machine Co.....609
S. C. Johnson & Son.....386-387
Lincoln-Schleuter Mach. Co., Inc.....584
National Sanding Machine Co.....589
Triple "A" Machine Co.....613

FLOOR SURFACING MACHINES—ELECTRIC
The American Floor Surfacing Machine Co.....475
Boetteher Co.....622
Campbell Machine Co.....600
Electric Rotary Machine Co.....609
Lincoln-Schlueter Mach. Co., Inc.....584
Master Woodworker Mfg. Co....578-579-597
National Sanding Machine Co.....589
Triple "A" Machine Co.....613
Wayvell Chappell & Co.....603

FLOORING—ART MARBLE
Franklyn R. Muller, Inc.....196-197

FLOORING—ASBESTOS
Everlasbestos Flooring Co.....707
Franklyn R. Muller, Inc.....196-197
Wonham, Bates & Goode Trading Corp.412

FLOORING—ASPHALT MASTIC
The Barber Asphalt Co.....482-483
The Philip Carey Co.....128-129
Franklyn R. Muller, Inc.....196-197

FLOORING—ASPHALT TILE
Franklyn R. Muller, Inc.....196-197

FLOORING—CANVAS
John Boyle & Co., Inc.....682

FLOORING—COMPOSITION
Armstrong Cork & Insulation Co.....168
The Barber Asphalt Co.....482-483
The Philip Carey Co.....128-129
Everlasbestos Flooring Co.....707
The Flint Rock Stucco Co.....190
Johns-Manville, Inc.....401
Franklyn R. Muller, Inc.....196-197
The Rocbond Co.....683
The Vitrolite Co.....158

FLOORING—CORK
Armstrong Cork Co.....212
Armstrong Cork & Insulation Co.....168

FLOORING—HARDWOOD
D. W. Alderman & Sons Co.....702
Arkansas Oak Flooring Co.....679
Birch Mfrs.....680
E. L. Bruce Co.....14-15
Crooks-Dittmar Co.....10
Farley & Loetscher Mfg. Co.....26-453
E. M. Long & Sons.....31
The Long-Bell Lbr. Co.....30
Maple Flooring Mfrs. Assn.....12-13
Oak Flooring Bureau.....425
Wood-Mosaic Co.....692

FLOORING—HOLLOW TILE
National Fire Proofing Co.....205
U. S. Gypsum Co.....171-653

FLOORING—LINOLEUM
Armstrong Cork Company.....212
Armstrong Cork & Insulation Co.....168
Certain-teed Products Corp.....515
Albert Pick & Co.....160

FLOORING—MAGNESIA COMPOSITION
Franklyn R. Muller, Inc.....196-197

FLOORING—MAGNESITE
Everlasbestos Flooring Co.....707
The Flint Rock Stucco Co.....190
Mac Stone Stucco Co., Inc.....694
Franklyn R. Muller, Inc.....196-197
Rocbond Co.....683

FLOORING—MOSAIC
Oak Flooring Bureau.....425
Wood Mosaic Co.....692

FLOORING—PARQUETRY
Arkansas Oak Flooring Co.....679
E. L. Bruce Co.....14-15
Oak Flooring Bureau.....425
Wood-Mosaic Co. 692

FLOORING—RUBBER TILE
J. W. Williams Slate Co.....686

FLOORING—SLATE
Knickerbocker Slate Corp.....709
Slatington Slate Co.....714
The Structural Slate Co.....62
Vendor Slate Co., Inc.....489

FLOORING—STEEL
Morton Mfg. Co.....79
Joseph T. Ryerson & Son., Inc.....522

FLOORING—TERRAZZO
Franklyn R. Muller, Inc.....196-197

FLOORING—TILE
Associated Tile Mfrs.....449

FLOORING—WOOD
Arkansas Oak Flooring Co.....679
Birch Mfrs. 680
E. L. Bruce Co.....14-15
The Long-Bell Lbr. Co.....30
Maple Flooring Mfrs. Assn.....12-13
Western Pine Mfrs. Assn.....17
Wood-Mosaic Co. 692

FLOORING—WOOD BLOCK
Arkansas Oak Flooring Co.....679
E. L. Bruce Co.....14-15

FLOORS—TILE
Associated Tile Mfrs.....449
Hornet Mantel & Tile Co.....93

FORKS—HAY
Hunt, Helm, Ferris & Co.....39-40-41-42
J. E. Porter Corp.....50

FORMS—CATCH BASIN (Concrete)
Anchor Concrete Machinery Co.....594
Concrete Equipment Company.....530-531
The Heltzel Steel Form & Iron Co.....621

FORMS—COLUMN
The J. B. Foote Foundry Co.....601
The Heltzel Steel Form & Iron Co.....621

FORMS—CONCRETE CONSTRUCTION
Cincinnati Iron Fence Co.....691
The J. B. Foote Foundry Co.....601
The Heltzel Steel Form & Iron Co.....621
Metal Forms Corp.....561
Truscon Steel Co.....64-65-66-67-68-69
Van Guilder System Concrete Building, Inc. 564-565
Western Pine Mfrs. Assn.....17

FORMS—CURB & GUTTER
The Heltzel Steel Form & Iron Co.....621
Metal Forms Corp.....561
The Standard Scale & Supply Corp.....559

FORMS—CULVERT
Northfield Iron Co.....712

FORMS—MANHOLE (Concrete)
The Heltzel Steel Form & Iron Co.....621
Metal Forms Corp.....561

FORMS—SIDEWALK
The Heltzel Steel Form & Iron Co.....621
Metal Farms Corp.....561
Truscon Steel Co.....64-65-66-67-68-69

FORMS—WALL
The Heltzel Steel Form & Iron Co.....621
Metal Forms Corp.....561
Van Guilder System Concrete Bldg., Inc. 564-565

FOUNTAINS—BUBBLING
Bowman Supply & Mfg. Co., Inc.....699
Century Electric Co.....690
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211

FOUNTAINS—DECORATIVE
John Fink Co., Inc.....717

FOUNTAINS—ELECTRICAL
Jonh Fink Co., Inc.....717

FOUNTAINS—ILLUMINATED
John Fink Co., Inc.....717

FOUNTAINS—PORTABLE
John Fink Co., Inc.....717

FRAMES—BLUEPRINT
Eugene Dietzgen Co.....600
B. L. Makepeace, Inc.....611
Warren-Knight Co. 560

FRAMES—CELLAR SASH (Steel)
Detaroit Steel Products Co.....74-75
Donley Bros. Co.....91
International Steel & Iron Co.....640-641
David Lupton's Sons Co.....76
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co.....64-65-66-67-68-69
Youngstown Pressed Steel Co.....636-637

FRAMES—CELLAR SASH (Wood)
Andersen Lumber Co. 194
Bradley, Miller & Co.....679
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Long-Bell Lbr. Co.....30
Western Pine Mfrs. Assn.....17

FRAMES—DOOR (Steel)
Cincinnati Iron Fence Co.....691
Edwards Mfg. Co.....134
General Fireproofing Bldg. Prods. Co. 181-688-705
Kawneer Co. 163
Moeschl Edwards Corrugating Co.....674
Morton Manufacturing Co.....79
Richards-Wilcox Mfg. Co.....10-11
Truscon Steel Co.....64-65-66-67-68-69
Henry Weis Mfg. Co.....78

FRAMES—DOOR (Wood)
Andersen Lumber Co. 194
Bradley, Miller & Co.....679
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Hartman-Sanders Co. 28
E. M. Long & Sons.....31
The Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17
The Whitney Co.....702

FRAMES—SASH (Steel)
Detroit Steel Products Co.....74-75
The Edwards Mfg. Co.....134
The General Fireproofing Bldg. Prods. Co. 181-688-705
David Lupton's Sons Co.....76
The Moeschl Edwards Corrugating Co..674
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co.....64-65-66-67-68-69

FRAMES—SASH (Wood)
Andersen Lumber Co. 194
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Hartmann-Sanders Co. 28
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17

FRAMES—WINDOW (Steel)
Detroit Steel Products Co.....74-75
The Edwards Mfg. Co.....134
The General Fireproofing Building Products Co. 181-688-705
David Lupton's Sons Co.....76
The Moeschl Edwards Corrugating Co..674
Morton Manufacturing Co.....79
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co.....64-65-66-67-68-69

FRAMES—WINDOW (Wood)
Andersen Lumber Co.....194
Bradley, Miller & Co.....679
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Hartmann-Sanders Co. 28
E. M. Long & Sons.....31
Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17
The Whitney Co.....702

FURNACES—HEATING (See Heating Plants)

FURNISHINGS—APARTMENT HOTEL
Concealed Bed Corp.....56
Garden City Plating & Mfg. Co.....707
Invisibowl Mfg. Corp.....710
Kozy Kitch Kitchenet Co.....701
Albert Pick & Co.....169
The Vitrolite Co.....158

FURNISHINGS—FIREPLACE
American Gas Assn.....457
Colonial Fireplace Co.....90
The Donley Bros. Co.....91
Guardian Gas Appliance Co.....468
Homer Furnace Co.....717
Hornet Mantel & Tile Co.....93
Klauer Mfg. Co.....717
Ohio Foundry & Mfg. Co.....94
Peerless Mfg. Co.....88-89
Albert Pick & Co.....169
Stover Mfg. & Engine Co.....620

FURNISHINGS—HOSPITAL
Concealed Bed Corp.....56
Garden City Plating & Mfg. Co.....707
The Vitrolite Co.....158

FURNITURE—BUILT-IN
Frank S. Betz Co.....177
Concealed Bed Corp.....56
Continental Steel Products Co.....80
Farley & Loetscher Mfg. Co.....26-453
Invisibowl Mfg. Corp.....710
Long-Bell Lbr. Co.....30
Albert Pick & Co.....169
Milton C. & Dwight Powell.....82
Western Pine Mfrs. Assn.....17

FURNITURE—DRAFTING ROOM
American Blue Print Paper Co.....621
Eugene Dietzgen Co.....600
Keuffel & Esser Co.....604-680
B. L. Makepeace, Inc.....611
Warren-Knight Co. 568

FURNITURE—RADIATOR
Schleicher, Inc. 500-501

FURNITURE—SCHOOL
E. W. A. Rowles Co.....687

FURRING—WALL
Morton Manufacturing Co.....79
Truscon Steel Co.....64-65-66-67-68-69
The Youngstown Pressed Steel Co...636-637

GARAGES—PRIVATE AND PUBLIC
The Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641
Milwaukee Corrugating Co..759-760-761-762
The Moeschl Edwards Corrugating Co..674
Truscon Steel Co.....64-65-66-67-68-69

GASKETS—DOOR
C. G. Hussey & Co.....77

GAS PRODUCERS
American Heating & Lighting Co.....473
Detroit Suburban Gas Plant Co.....472

GATES—BIN
The Heltzel Steel Forms & Iron Co....621

GATES—ELEVATOR
Cincinnati Iron Fence Co.....691
The Heltzel Steel Form & Iron Co.....621
Logan Co. 696
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714

GATES—FOLDING
Cincinnati Iron Fence Co.....691
The Heltzel Steel Form & Iron Co.....621
International Iron & Steel Co.....640-641
Logan Co.....696

GATES—IRON
Cincinnati Iron Fence Co.....691
The Heltzel Steel Form & Iron Co.....621
Kwik Mix Concrete Mixer Co.....556
Logan Co. 696

GAUGES—BUTT
Monarch Engineering Co.....152
Stanley Works 34-35

GAUGES—HATCHET
L. A. Sayre Co.....716

GAUGES—MORTISE
Stanley Works 34-35
Woodworkers Tool Works.....615

GAUGES—SAW
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Ralph M. Kennedy.....612
Whisler Mfg. Co.....712
Woodworkers Tool Works.....615

GAUGES—SCRATCH
Stanley Works 34-35
The L. S. Starrett Co.....602

GAUGES—SHINGLING
F. D. Kees Mfg. Co.....694
L. A. Sayre Co.....716

GAUGES—STAIR
The L. S. Starrett Co.....602
Woodworkers Tool Works.....615

GENERATORS—ELECTRIC
The American Floor Surfacing Machine Co. 475
Delco-Light Co. 715
Fairbanks, Morse & Co.....150
General Electric Co. 432-433-434-435-436-437-438-439-440-441

GLASS—LEADER
Henry Hope & Sons.....701

GLASS—PLATE
The J. W. Coulson & Co.....159
Ford Motor Co.....536
International Steel & Iron Co.....640-641
The Kawneer Co. 163

GLASS—PRISM
International Steel & Iron Co.....640-641

GLASS—SIDEWALK
International Steel & Iron Co.....640-641

GLASS—WINDOW
American Window Glass Co.....678

GLASS—WIRE
The J. W. Coulson & Co.....159
International Steel & Iron Co.....640-641
The Moeschl Edwards Corrugating Co..674

GLASSES—LEVEL
Geier & Bluhm, Inc.....617
Stanley Works 34-35
The L. S. Starrett Co.....602
Warren-Knight Co. 560

GLUE—VEGETABLE
Perkins Glue Company.....646

GLUEPOTS—ELECTRIC
General Electric Co. 432-433-434-435-436-437-438-439-440-441
J. D. Wallace & Co.....570-571

GOUGES—WOOD
The James Swan Co.....592
The L. & I. J. White Co.....708

GRANITE—CRUSHED
The Flint Rock Stucco Co.....199
Vicro Corp. 195

GRANULES—ROOFING
The Vicro Corp. 195

GRATES—AIR
The Donley Bros. Co.....91
International Steel & Iron Co.....640-641
The Ohio Foundry & Mfg. Co.....94

GRATES—AREA
Cincinanti Iron Fence Co.....691
International Steel & Iron Co.....640-641
Logan Co. 696

GRATES—CELLAR WALL
Cincinnati Iron Fence Co.....691
The Donley Bros. Co.....91
International Steel & Iron Co.....640-641
The Majestic Company.....96
Sterling Foundry Co.....95

GRATES—FIREPLACE
Colonial Fireplace Co. 90
H. W. Covert Co. 695
The Donley Bros. Co. 91
Electric Fireplace Mfg. Co. 443
Hornet Mantel & Tile Co. 93
Klauer Mfg. Co. 717
The Ohio Foundry & Mfg. Co. 94
Pearless Mfg. Co. 88-89
Pioneer Fireplace Co. 676

GRATINGS—IRON
Cincinnati Iron Fence Co. 691
The Donley Bros. Co. 91
Kwik-Mix Concrete Mixer Co. 556
Logan Co. 696

GRATINGS—STEEL
Cincinnati Iron Fence Co. 691
Kwik Mix Concrete Mixer Co. 556
Logan Co. 696

GRATINGS—WIRE
Cincinnati Iron Fence Co. 691
Kwik-Mix Concrete Mixer Co. 556
Logan Co. 696

GREENHOUSE AND CONSERVATORY CONSTRUCTION
Hitchings & Co. 509

GRILLES—BRONZE
The Kawneer Co. 163

GRILLES—RADIATOR
Associated Tile Mfrs. 449
The Auer Register Co. 700

GRILLES—STEEL AND WIRE
The Auer Register Co. 700
Cincinnati Iron Fence Co. 691
Garden City Plating & Mfg. Co. 707
International Steel & Iron Co. 640-641
Kwik Mix Concrete Mixer Co. 556
Logan Co. 696
Manhattan Perforated Metal Co., Inc. 713
L. J. Mueller Furnace Co. 103-104-105
The Rock Island Register Co. 110
Wickwire Spencer Steel Co., Inc. 184

GRILLES—VENTILATING AND HOT AIR
The Auer Register Co. 700
Garden City Plating & Mfg. Co. 707
Manhattan Perforated Metal Co., Inc. 713
L. J. Mueller Furnace So. 103-104-105
The Rock Island Register Co. 110
The Vitrolite Co. 158
Wickwire Spencer Steel Co., Inc. 184

GRILLES—WOOD
Bertelsen Adjustable Grille Co. 715
L. J. Mueller Furnace So. 103-104-105
Rock Island Register Co. 110
Western Pine Mfrs. Assn. 17

GRINDERS—DISK
Crescent Machine Co. 568-569
Electric Rotary Machine Co. 609
Gallmeyer & Livingston Co. 586
Woodworkers Tool Works 615

GRINDERS—FLOOR
The American Floor Surfacing Machine Co. 475
Empire Floor Machine Corp. 616
Lincoln-Schlueter Mach. Co., Inc. 584

GRINDERS—TOOL
Electro-Magnetic Tool 560
Gallmeyer & Livingston Co. 609
Richards-Wilcox Mfg. Co. 10-11
Joseph T. Ryerson & Son, Inc. 522
Stanley Works 34-35
Wissler Instrument Co. 610
Wodack Electric Tool Corp. 622-708

GRINDSTONES
E. C. Atkins & Co. 544
Richards-Wilcox Mfg. Co. 10-11

GROUTERS—CEMENT
Abram Cement Tool Co. 562

GUARDS—DOOR
Brasco Mfg. Co. 161
Cincinati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
International Steel & Iron Co. 640-641
Logan Co. 696
National Brass Co. 678

GUARDS—LAMP
McGill Mfg. Co. 447

GUARDS—RADIATOR
Cincinnati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
Manhattan Perforated Metal Co., Inc. 713
Wickwire Spencer Steel Co., Inc. 184

GUARDS—SAFETY
Cincinnati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
The Crescent Machine Co. 568-569
Manhattan Perforated Metal Co., Inc. 713
The Patent Scaffolding Co. 605
Woodworkers Tool Works 615
The Youngstown Pressed Steel Co. 636-637

GUARDS—SAW
E. C. Elkins & Co. 544
Huther Bros. Saw Mfg. Co. 580

GUARDS—SKYLIGHT
Cincinnati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
Logan Co. 696
The Moeschl Edwards Corrugating Co. 674
Wickwire Spencer Steel Co., Inc. 184

GUARDS—SNOW
Cincinnati Iron Fence Co. 691
C. G. Hussey & Co. 77

GUARDS—STALL
Cincinnati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
Kwik Mix Concrete Mixer Co. 556
Logan Co. 696

GUARDS—WHEEL
Allith-Prouty Co. 46-47
Cincinati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
The Donley Bros. Co. 91
Gallmeyer & Livingston Co. 586
The Heltzel Steel Form & Iron Co. 621
International Steel & Iron Co. 640-641
Kwik Mix Concrete Mixer Co. 556
Logan Co. 96
Manhattan Perforated Metal Co., Inc. 713

GUARDS—WINDOW
Cincinnati Iron Fence Co. 691
Consolidated Expanded Metal Companies 645
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
The Heltzel Steel Form & Iron Co. 621
International Steel & Iron Co. 640-641
Kwik Mix Concrete Mixer Co. 556
Logan Co. 696
The Moeschl Edwards Corrugating Co. 674
National Brass Co. 678
E. W. A. Rowles Co. 687
Wickwire Spencer Steel Co., Inc. 184

GUIDES—LETTERING
The Wood-Regan Instrument Co., Inc. 426

GUTTERS—FIR
E. M. Long & Sons 81

HAMMERS—CARPENTERS'
Ever Hot Mfg. Co. 469
Prentiss Vise Co. 613
Stanley Works 34-35

HAMMERS—ELECTRIC
Electro-Magnetic Tool 560
Jospeh T. Ryerson & Son, Inc. 522
Syntron Co. 619

HAMMERS—MARKING
R. D. Swisher Mfg. Co. 618

HANGERS—ACCORDION DOOR
Allith-Prouty Co. 46-47
The Coburn Trolley Track Mfg. Co. 49
McCabe Hanger Mfg. Co. 685
McKinney Mfg. Co. 48
F. E. Myers Co. 146-147
Richards-Wilcox Mfg. Co. 10-11
Wagner Mfg. Co. 53

HANGERS—BARNDOOR
Allith-Prouty Co. 46-47
The Coburn Trolley Track Mfg. Co. 49
Frantz Mfg. Co. 3
Hunt-Helm-Ferris & Co. 39-40-41-42
McCabe Hanger Mfg. Co. 685
McKinney Mfg. Co. 48
The F. E. Myers & Bro. Co. 146-147
National Mfg. Co. 768
J. E. Porter Corp. 50
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53

HANGERS—CLOTHES
Cincinnati Iron Fence Co. 691
Garden City Plating & Mfg. Co. 707

HANGERS—EAVES TROUGH
Klauer Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762
The Moeschl Edwards Corrugating Co. 674
Wheeling Metal & Mfg. Co. 136

HANGERS—ELEVATOR DOOR
McCabe Hanger Mfg. Co. 685
Richards-Wilcox Mfg. Co. 10-11
Wagner Mfg. Co. 53

HANGERS—GARAGE DOOR
Allith-Prouty Co. 46-47
The Coburn Trolley Track Mfg. Co. 49
Frantz Mfg. Co. 3
Hunt-Helm-Ferris & Co. 39-40-41-42
McCabe Hanger Mfg. Co. 685
McKinney Mfg. Co. 48
F. E. Myers Co. 146-147
National Mfg. Co. 768
J. E. Porter Corp. 50
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53

HANGERS—HOUSE DOOR
Allith-Prouty Co. 46-47
Garden City Plating & Mfg. Co. 707
McCabe Hanger Mfg. Co. 685
Richards-Wilcox Mfg. Co. 10-11
Wagner Mfg. Co. 53

HANGERS—JOIST
International Steel & Iron Co. 640-641
Joseph T. Ryerson & Son, Inc. 522

HANGERS—PIPE
Bowman Supply & Mfg. Co., Inc. 699
Hardin-Lavin Co. 755-756-757-766
C. G. Hussey & Co. 77
B. Karol & Sons Co. 210-211
Klauer Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762

HANGERS—SCREEN
Frantz Mfg. Co. 3
Martin Hauser Mfg. Co. 712
F. D. Kees Mfg. Co. 694
McKinney Mfg. Co. 48
Phenix Mfg. Co. 706
J. E. Porter Corp. 50
Stanley Works 34-35

HANGERS—SLIDING PARTITION
Allith-Prouty Co. 46-47
Coburn Trolley Track Mfg. Co. 49
Garden City Plating & Mfg. Co. 707
McCabe Hanger Mfg. Co. 685
Richards-Wilcox Mfg. Co. 10-11
Wagner Mfg. Co. 53

HANGERS—STORM SASH
Frantz Mfg. Co. 3
Martin Hauser Mfg. Co. 712
F. D. Kees Mfg. Co. 694
McKinney Mfg. Co. 48
National Mfg. Co. 768
Phenix Mfg. Co. 706
J. E. Porter Corp. 50
Stanley Works 34-35

HANGERS—WALL
Crane Co. 154

HANGERS—GARMENT
Knape & Vogt Mfg. Co. 651

HARDENERS—CEMENT
Adensite Co., Inc. 710
Anti-Hydro Waterproofing Co. 681-684
A. C. Horn Co. 499
Lincoln-Schlueter Mach Co., Inc. 584
The Sherwin-Williams Co. 393
Truscon Steel Co. 64-65-66-67-68-69

HARDENERS—FLOOR
Adensite Co., Inc. 710
Anti-Hydro Waterproofing Co. 681-684
A. C. Horn Co. 499
Living-Stone Co. 712
Truscon Steel Co. 64-65-66-67-68-69

HARDWARE—AUSTRAL WINDOW
Austral Window Co. 215

HARDWARE—AWNING
John Boyle & Co., Inc. 682

HARDWARE—CASEMENT-WINDOW
Frantz Mfg. Co. 3
Greene, Tweed & Co. 712
Griffin Mfg. Co. 691
Hagstrom Mfg. Co. 698
Henry Hope & Sons 701
The H. B. Ives Co. 692
McKinney Mfg. Co. 48
National Brass Co. 678
Richards-Wilcox Mfg. Co. 10-11
Sargent & Company 54-55
Stanley Works 34-35
Truscon Steel Co. 64-65-66-67-68-69
Vincent Whitney Co. 36-37

HARDWARE—COLONIAL
Colonial Hardware Mfrs. 677
McKinney Mfg. Co. 48

HARDWARE—DOOR
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
The Coburn Trolley Track Mfg. Co. 49
Colonial Hardware Mfrs. 677
Frantz Mfg. Co. 3
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
Griffin Mfg. Co. 691
The H. B. Ives Co. 692
McKinney Mfg. Co. 48
National Brass Co. 678
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55
Stanley Works 34-35
Wagner Mfg. Co. 53

HARDWARE—FIREDOOR
Allith-Prouty Co. 46-47
Chicago Spring Hinge Co. 43
The Coburn Trolley Track Mfg. Co. 49
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
Moeschl Edwards Corrugating Co. 674
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53
Willis Mfg. Co. 85

HARDWARE—GARAGE
Allith-Prouty Co. 46-47
Chicago Spring Hinge Co. 43
The Coburn Trolley Track Mfg. Co. 49
Frantz Mfg. Co. 3
Griffin Mfg. Co. 691
Hunt-Helm-Ferris & Co. 39-40-41-42
McKinney Mfg. Co. 48
National Mfg. Co. 768
J. E. Porter Corp. 50
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35

HARDWARE—KITCHEN CABINET
Frantz Mfg. Co. 3
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
National Brass Co. 678
National Lock Co. 686
Truscon Steel Co. 64-65-66-67-68-69

HARDWARE—LAVATORY
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
Crane Co. 154
Greene, Tweed & Co. 712
H. B. Ives Co. 692
Sargent & Company 54-55
Standard Sanitary Mfg. Co. 389

HARDWARE—SCREEN
Allith-Prouty Co. 46-47
Chicago Spring Hinge Co. 43
Frantz Mfg. Co. 3
Greene, Tweed & Co. 712
Griffin Mfg. Co. 691
H. B. Ives Co. 692
F. D. Kees Mfg. Co. 694
McKinney Mfg. Co. 48
National Brass Co. 678
National Mfg. Co. 768
Phenix Mfg. Co. 706
J. E. Porter Corp. 50
Sargent & Company 54-55
Stanley Works 34-35
Wagner Mfg. Co. 53

HARDWARE—TRANSOM
Greene, Tweed & Co. 712
Hagstrom Mfg. Co. 698
H. B. Ives Co. 692
McKinney Mfg. Co. 48
Manhattan Perforated Metal Co., Inc. 713
National Brass Co. 678
Sargent & Company 54-55
Stanley Works 34-35
Vincent Whitney Co. 36-37

HATCHETS
Richards-Wilcox Mfg. Co. 10-11
L. A. Sayre Co. 716

HATCHETS—LATHING AND SHINGLING
L. A. Sayre Co. 716

HEADS—CUTTER
American Saw Mill Machinery Co. 574-575
Combination Woodworking Machine Co. 587
Crescent Machine Co. 568-569
Huther Bros. Saw Mfg. Co. 580
Ralph M. Kennedy 612
Woodworkers Tool Works 615

HEADS—DADO
American Saw Mill Machinery Co. 574-575
E. C. Atkins & Co. 544
Combination Woodworking Machine Co. 587
Crescent Machine Co. 568-569
DeWalt Products Co. 576-577
Huther Bros. Saw Mfg. Co. 580
Jones Superior Machine Co. 598
Ralph M. Kennedy 612
Woodworkers Tool Works 615

HEADS—JOINTER
American Saw Mill Machinery Co. 574-575
Combination Woodworking Machine Co. 587
Crescent Machine Co. 568-569
Jones Superior Machine Co. 598
Ralph M. Kennedy 612
Whisler Mfg. Co. 712
Woodworkers Tool Works 615

HEADS—SHAPER
Combination Woodworking Machine Co. 587
Crescent Machine Co. 568-569
Ralph M. Kennedy 612
Woodworkers Tool Works 615

HEATERS—CABINET
A-B Stove Company Company 458-459
American Radiator Company 106-107-476-477
Hardin-Lavin Co. 755-756-757-766
L. J. Mueller Furnace Co. 103-104-105

HEATERS—CONCRETE
Standard Scale & Supply Corp. 559

HEATERS—GARAGE
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc. 699
Hardin-Lavin Co. 755-756-757-766
Klauer Mfg. Co. 717
L. J. Mueller Furnace Co. 103-104-105
Ohio Foundry & Mfg. Co. 94
Thatcher Co. 663

HEATERS—GAS
A-B Stove Co. 458-459
American Heating & Lighting Co. 473
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc. 699
Buffalo Co-Operative Stove Co. 97
Crane Co. 154
Guardian Gas Appliance Co. 468
Otto E. Hansen & Sons 703
Hardin-Lavin Co. 755-756-757-766
L. J. Mueller Furnace Co. 103-104-105
Ohio Foundry & Mfg. Co. 94
Peerless Mfg. Co. 88-89
Platt Water Heater Co. 464
Geo. D. Roper Corp. 465
Stanley Plumbing Supply Co., Inc. 703

HEATERS—ROOM
American Radiator Co. 106-107-476-477
Beckwith Co. 108-109
Bowman Supply & Mfg. Co., Inc. 699
Buffalo Co-Operative Stove Co. 97
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co. 113
Homer Furnace Co. 717
International Heater Co. 115
Kaustine Company, Inc. 647
L. J. Mueller Furnace Co. 103-104-105
Ohio Foundry & Mfg. Co. 94
Peerless Mfg. Co. 88-89
Perfection Stove Co. 697
Geo. D. Roper Corp. 465

HEATERS—SCHOOLROOM
American Radiator Co. 106-107-476-477
Beckwith Company 108-109
Buffalo Co-Operative Stove Co. 97
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co. 113
Homer Furnace Co. 717
International Heater Co. 115
Kaustine Company, Inc. 647
L. J. Mueller Furnace Co. 103-104-105
Thatcher Company 663

HEATERS—TANK
American Heating & Lighting Co. 473
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
Humphrey Co. 461
Hunt-Helm-Ferris & Co. 39-40-41-42
L. J. Mueller Furnace Co. 103-104-105
Perfection Stove Co. 697
Thatcher Company 663

HEATERS—WATER
American Gas Assn. 457
American Heating & Lighting Co. 473
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Excelso Specialty Co. 471
Hardin-Lavin Co. 755-756-757-766
Homer Furnace Co. 717
Humphrey Co. 461
International Heater Co. 115
Manhattan Perforated Metal Co., Inc. 713
L. J. Mueller Furnace Co. 103-104-105
Perfection Stove Co. 697
Piatt Water Heater Co. 464
Quad Stove Works 692
Geo. D. Roper Corp. 465
Stanley Plumbing Supply Co., Inc. 663
Thatcher Co. 663
S. Wilks Mfg. Co. 703

HEATERS—WATER (Automatic)
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Everhot Heater Co. 469
Humphrey Co. 461
International Heater Co. 115
Manhattan Perforated Metal Co., Inc. 713
Piatt Water Heater Co. 464

HEATING PLANTS—HOT WATER
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
International Heater Co. 115
B. Karol & Sons Co. 210-211
Manhattan Perforated Metal Co., Inc. 713
L. J. Mueller Furnace Co. 103-104-105
Stanley Plumbing Supply Co., Inc. 703
Thatcher Company 663
U. S. Radiator Corp. 114

HEATING PLANTS—OIL BURNERS
The Beckwith Co. 108-109
Bowman Supply & Mfg. Co., Inc. 699
Burnham Boiler Corp. 111
Hardinge Bros., Inc. 451
Hess Warming & Ventilating Co. 116-713
Manhattan Perforated Metal Co., Inc. 713
Piatt Water Heater Co. 464
Silent Automatic Corp. 118
W. B. Wilde Co. 117

HEATING PLANTS—PIPELESS FURNACE
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Beckwith Co. 108-109
Bovee Furnace Wks. 697
Bowman Supply & Mfg. Co., Inc. 699
Buffalo Co-Operative Stove Co. 97
J. B. Foote Foundry Co. 601
Hardin-Lavin Co. 755-756-757-766
Henry Furnace and Foundry Co. 113
Hess Warming & Ventilating Co. 116-713
Homer Furnace Co. 717
International Heater Co. 115
B. Karol & Sons Co. 210-211
Majestic Co. 96
L. J. Mueller Furnace Co. 103-104-105
Thos. Nugent's Sons, Inc. 693
Rybolt Heater Co. 479
Thatcher Co. 663

HEATING PLANTS—STEAM
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
International Heater Co. 115
B. Karol & Sons Co. 210-211
L. J. Mueller Furnace Co. 103-104-105
Stanley Plumbing Supply Co., Inc. 703
Thatcher Co. 663
U. S. Radiator Corp. 114

HEATING PLANTS—VAPOR SYSTEM
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
International Heater Co. 115
L. J. Mueller Furnace Co. 103-104-105
U. S. Radiator Corp. 114

HEATING PLANTS—WARM AIR FURNACE
American Gas Assn. 457
American Radiator Co. 106-107-476-477
Andrews Heating Co. 715
Beckwith Co. 108-109
Bovee Furnace Works. 697
Bowman Supply and Mfg. Co., Inc. 699
Buffalo Co-Operative Stove Co. 97
Burnham Boiler Corp. 111
J. B. Foote Foundry Co. 601
Hardin-Lavin Co. 755-756-757-766
Henry Furnace and Foundry Co. 113
Hess Warming & Ventilating Co. 116-713
Holland Furnace Co. 112
Homer Furnace Co. 717
International Heater Co. 115
B. Karol & Sons Co. 210-211
Majestic Company 96
L. J. Mueller Furnace Co. 103-104-105
Thos. Nugent's Sons, Inc. 693
Rock Island Register Co. 110
Rybolt Heater Co. 479
Stanley Plumbing Supply Co., Inc. 703
Thatcher Company 663

HEATING SYSTEMS—GREENHOUSE
Hitchings & Co. 479

HINGES—BLIND & SHUTTER
Griffin Mfg. Co. 691
McKinney Mfg. Co. 48
Stanley Works 34-35

HINGES—BUTT
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
Frantz Mfg. Co. 3
Garden City Plating & Mfg. Co. 707
Greene, Tweed & Co. 712
McKinney Mfg. Co. 48
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55
Stanley Works 34-35

HINGES—FLOOR
Allith-Prouty Co. 46-47
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
National Mfg. Co. 768
Sargent & Co. 54-55

HINGES—GATE
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
Cincinnati Iron Fence Co. 691
Frantz Mfg. Co. 3
McKinney Mfg. Co. 48
National Mfg. Co. 768
Sargent & Company 54-55
Stanley Works 34-35

HINGES—PIVOT
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43

HINGES—SCREEN DOOR
Allith-Prouty Co. 46-47
Bommer Spring Hinge Co. 44
Chicago Spring Hinge Co. 43
Frantz Mfg. Co. 3
Greene, Tweed & Co. 712
Griffin Mfg. Co. 691
McKinney Mfg. Co. 48
National Brass Co. 678
National Mfg. Co. 768
Sargent & Co. 54-55
Stanley Works 34-35

HINGES—STRAP
Frantz Mfg. Co. 3
Garden City Plating & Mfg. Co. 707
Griffin Mfg. Co. 691
Hunt-Helm-Ferris & Co. 39-40-41-42
McKinney Mfg. Co. 48
National Brass Co. 678
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53

HINGES—SURFACE
Chicago Spring Hinge Co. 43
Frantz Mfg. Co. 3
Griffin Mfg. Co. 691
McKinney Mfg. Co. 48
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53

HOISTS—CELLAR
Highwood Dumbwaiter Co.....704
Kiesling & Son.....698
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714
Storm Mfg. Co.....714

HOISTS—CHAIN
Kiesling & Son.....698
Richards-Wilcox Mfg. Co.....10-11
Joseph T. Ryerson & Son, Inc.....522
Sedgwick Machine Wks.....670

HOISTS—CONTRACTORS
American Cement Machine Co., Inc.....557
American Saw Mill Machinery Co...574-575
C. H. & E. Mfg. Co., Inc.....582
Construction Machinery Co.....546-547
Ireland Machine & Foundry Co., Inc....622
Novo Engine Company.....604
Orr & Sembower, Inc.....610
J. E. Porter Corp.....50
Sidney Elevator Mfg. Co.....714
Standard Scale & Supply Corp.....559
Universal Hoist & Mfg. Co.....622

HOISTS—ELECTRIC
American Cement Machine Co., Inc.....557
Novo Engine Co.....604
Orr & Sembower, Inc.....610
Joseph T. Ryerson & Son, Inc.....522
Sasgen Derrick Co.....543
Standard Scale & Supply Corp.....559
Universal Hoist & Mfg. Co.....622

HOISTS—FRICTION
American Cement Machine Co., Inc.....557
American Saw Mill Machinery Co...574-575
Ireland Machine & Foundry Co., Inc....622
Orr & Sembower, Inc.....610
J. E. Porter Corp.....50
Standard Scale & Supply Corp.....559
Universal Hoist & Mfg. Co.....622

HOISTS—FUEL
Highwood Dumbwaiter Co.....704
Sedgwick Machine Wks.....670

HOISTS—GASOLINE
American Cement Machine Co., Inc.....557
American Saw Mill Machinery Co...574-575
Constructions Machinery Co.....546-547
Kwik Mix Concrete Mixer Co.....556
Novo Engine Company.....604
Orr & Sembower, Inc.....610
Sasgen Derrick Co.....543
Standard Scale & Supply Corp.....559
Universal Hoist & Mfg. Co.....622

HOISTS—HAND
Highwood Dumbwaiter Co.....704
Hunt-Helm-Ferris & Co.....39-40-41-42
Kiesling & Son.....698
Richards-Wilcox Mfg. Co.....10-11
Joseph T. Ryerson & Son, Inc.....522
Sedgwick Machine Works.....670
Sidney Elevator Mfg. Co.....714

HOISTS—HAY
American Saw Mill Machinery Co...574-575
Ireland Machine & Foundry Co., Inc...622
Novo Engine Company.....604
J. E. Porter Corp.....50
Sedgwick Machine Wks.....670
Universal Hoist & Mfg. Co.....622

HOISTS—INVALID
Farley & Loetscher Mfg. Co.....26-453
Highwood Dumbwaiter Co.....704
Kiesling & Son.....698
Sedgwick Machine Wks.....670
Sidney Elevator Mfg. Co.....714
Storm Mfg. Co.....714

HOISTS—ROPE
Highwood Dumbwaiter Co.....705
Kiesling & Son.....698
Sedgwick Machine Wks.....670
Sidney Elevator Mfg. Co.....714

HOISTS—STEAM
Orr & Sembower, Inc.....610
Standard Scale & Supply Corp.....559

HOLDERS—DOOR
Austral Window Co.....215
Automatic Tool Co., Inc.....710
Caldwell Mfg. Co.....704
Frantz Mfg. Co.....3
Grand Specialties Co.....543
Greene, Tweed & Co.....712
Griffin Mfg. Co.....691
Hunt-Helm-Ferris & Co.....39-40-41-42
H. B. Ives Co.....692
Knowlson-Stevenson Co.....51
McKinney Mfg. Co.....48
National Brass Co.....678
National Mfg. Co.....708
Richards-Wilcox Mfg. Co.....10-11
Sargent & Company.....54-55
Stanley Works.....34-35
Sterling Foundry Co.....95
Wagner Mfg. Co.....53

HOLDERS—GARAGE DOOR
Allith-Prouty Co.....46-47
Grand Specialties Co.....543
Phenix Mfg. Co.....706
Sasgen & Co.....543
Stanley Wks.....34-35

HOLDERS—SASH
Austral Window Co.....215
Barnes Lock & Sash Holder Co.....660
Frantz Mfg. Co.....3
Hardware Sales Co.....712
Phenix Mfg. Co.....706
Sargent & Co.....54-55
Stanley Works.....34-35

HOOKS—TILE
Associated Tile Mfr.....449
Central Specialty Mfg. Co.....715
Donley Bros. Co.....91

HOUSES—PORTABLE
Asbestos Shingle, Slate & Sheathing Co.127
Edwards Co.....134
Milwaukee Corrugating Co..759-760-761-762

INCINERATORS
American Gas Association.....457
Buffalo Co-Operative Stove Co.....97
Guardian Gas Appliance Co.....468
Kerner Incinerator Co.....98
Manhattan Perforated Metal Co., Inc....713

INKS—DRAWING
American Blue Print Paper Co.....621
Keuffel & Esser Co.....604-680
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
Warren-Knight Co.....560

INSERTS—CONCRETE
Ackerman-Johnson Co.....684
Donley Bros. Co.....91
Gabriel Steel Co.....86-87
Richards-Wilcox Mfg. Co.....10-11
Joseph T. Ryerson & Son, Inc.....522
Sterling Fdry. Co.....95
Truscon Steel Co.....64-65-66-67-68-69

INSTRUMENTS—DRAWING
American Blue Print Paper Co.....621
Eugene Dietzgen Co.....600

INSTRUMENTS—SURVEYING
A. S. Aloe Co.....555-585-607
American Blue Print Paper Co.....621
L. Beckman Co.....593
Eugene Dietzgen Co.....600
Geier & Bluhm, Inc.....617
Keuffel & Esser Co.....604-680
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
L. L. Starrett Co.....602
Warren-Knight Co.....560
Wissler Instrument Co.....610

INSULATION—COLD STORAGE
Armstrong Cork & Insulation Co.....168
Samuel Cabot, Inc.....491
The Celotex Co.....391
Certain-teed Products Corp.....515
Cornell Wood Products Co.....33
Flax-li-num Insulating Co.....170
Herrick Refrigerator Co.....144
Insulite Co.....664
Invincible House Lining Co.....699
Sall Mountain Co.....123-124-125-126
Universal Gypsum Co.....661
Van Guilder System Concrete Bldg., Inc.....564-565
Wonham, Bates & Goode Trading Corp..413

INSULATION—HEAT
Airinsulate Company.....218
Armstrong Cork & Insulation Co.....168
Bishopric Mfg. Co.....403-404
Samuel Cabot, Inc.....491
Philip Carey Co.....128-129
Celotex Company.....391
Certain-teed Products Corp.....515
Cornell Wood Products Co.....33
Flax-li-num Insulation Co.....170
Insulite Co.....644
Invincible House Lining Co.....699
Sall Mountain Co.....123-124-125-126
United States Gypsum Co.....171-653
U. S. Materials Co.....466-467
U. S. Mineral Wool Co.....166
Universal Gypsum Co.....661
Van Guilder System Concrete Bldg, Inc.....564-565
Wonham, Bates & Goode Trading Corp..413

INSURANCE—AUTOMOBILE
American Mutual Liability Insurance Co.700

INSURANCE—COMPENSATION
American Mutual Liability Ins. Co.....700

IRON—ARCHITECTURAL
Cincinnati Iron Fence Co.....691
Garden City Plating & Mfg. Co.....707
International Steel & Iron Co.....640-641
Logan Co.....696
Manhattan Perforated Metal Co., Inc....713
Milwaukee Corrugating Co..759-760-761-762

IRONERS—CLOTHES
American Gas Assn.....457

IRONS—BRANDING
Everhot Mfg. Co.....621
Patent Scaffolding Co.....605

IRONS—PLANE
E. C. Atkins & Co.....544
Sargent & Co.....54-55
Stanley Works.....34-35
L. & I. J. White Co.....708

IRONS—SOLDERING
Everhot Mfg. Co.....621
Hardin-Lavin Co.....755-756-757-766
Milwaukee Corrugating Co..759-760-761-762
Geo. D. Roper Corp.....465

JACKS—HOUSE MOVING
Ireland Mach. & Fdry. Co., Inc.....622
La Plant Choate Mfg. Co.....696
A. L. Swett Iron Works.....677

JACKS—LADDER
Newark Ladder & Bracket Mfg. Co.....706
Patent Scaffolding Co.....605

JAMBS—DOOR (Steel)
Moeschl Edwards Corrugating Co.....674
Henry Weis Mfg. Co.....78

JAMBS—DOOR (Wood)
Western Pine Mfrs. Assn.....17

JOINTERS—WOODWORKING
American Saw Mill Machinery Co....574-575
E. C. Atkins & Co.....544
W. B. & J. E. Boice.....622
Combination Woodworking Mach. Co...587
Crescent Machine Co.....568-569
Gallmeyer & Livingston Co.....586
Heston & Anderson.....596
Hutchinson Mfg. Co., Inc.....581
Huther Bros. Saw Mfg. Co.....590
Jones Superior Machine Co.....598
Ralph M. Kennedy.....612
Kornau Machine Co.....612
Silver Mfg. Co.....610
Stanley Works.....34-35
J. D. Wallace & Co.....570-577
Whisler Mfg. Co.....712
Woodworkers Tool Works.....615

JOINTS—CONTRACTION
Truscon Steel Co.....64-65-66-67-68-69

JOINTS—EXPANSION
Philip Carey Co.....128-129

JOINTS—SIDING
F. D. Kees Mfg. Co.....604

JOINTS—PRESSED STEEL
Berger Mfg. Co.....185
Bostwick Steel Lath Co.....642
Gabriel Steel Co.....86-87
International Steel & Iron Co.....640-641
Truscon Steel Co.....64-65-66-67-68-69

KALSOMINE
Certain-teed Products Corp.....515
Martin Senour Co.....767
Reardon Co.....72
Sherwin-Williams Co.....393

KITCHENS—STEEL
Frank S. Betz Co.....117
Majestic Steel Cabinet Co.....485
Murphy Door Bed Co.....58
Milton C. & Dwight Powell.....82

KITCHENS—WOOD
Curtis Cos. Service Bureau.....18
Roberts Sash & Door Co.....751-752-753
Wasmuth-Endicott Co.....178-179
Western Pine Mfrs. Assn.....17

KITCHENETTES
Frank S. Betz Co.....117
Continental Steel Products Co.....80
Kozy Kitch Kitchenet Co.....701
Majestic Steel Cabinet Co.....485
Roberts Sash & Door Co.....751-752-753
Wasmuth-Endicott Co.....178-179
"White" Door Bed Co.....169

KNIVES—BAND
E. C. Atkins & Co.....544
Crescent Machine Co.....568-569
Ralph M. Kennedy.....612
Woodworkers Tool Works.....615

KNIVES—CIRCULAR
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Ralph M. Kennedy.....612
L. & I. J. White Co.....708
Woodworkers Tool Works.....615

KNIVES—DRAW
E. C. Atkins & Co.....544
James Swan Co.....592
L. & I. J. White Co.....708

KNIVES—JOINTER
E. C. Atkins & Co.....544
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
Ralph M. Kennedy.....612
L. & I. J. White Co.....708
Woodworkers Tool Works.....615

KNIVES—MOULDING
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
Ralph M. Kennedy.....612
L. & I. J. White Co.....708
Woodworkers Tool Works.....615

KNIVES—PLANER
American Saw Mill Machinery Co....574-575
E. C. Atkins & Co.....544
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
Ralph M. Kennedy.....612
L. & I. J. White Co.....708
Woodworkers Tool Works.....615

KNOCKERS—DOOR
Colonial Hardware Mfrs.....677
Greene, Tweed & Co.....712
Hunt-Helm-Ferris & Co.....39-40-41-42
Sargent & Co.....54-55

LACQUERS
Sherwin-Williams Co.....393
Toch Brothers.....711
Truscon Laboratories.....70-71

LADDERS
Coburn Trolley Track Mfg. Co.....49
E. M. Long & Sons.....81
Newark Ladder & Bracket Mfg. Co....706
Patent Scaffolding Co.....605
Roebond Co.....683
T. Thompson Ladder Co.....708

LADDERS—STORE
Allith-Prouty Co. 46-47

LADDERS—SWIMMING POOL
Brasco Mfg. Co. 161
Logan Co. 696

LANTERNS—ART
Art Lantern Importing Co. 715

LATCHES
Allith-Prouty Co. 46-47
Chicago Spring Hinge Co. 43
Frantz Mfg. Co. 3
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55

LATH—EXPANDED METAL
Bates Expanded Steel Truss Co. 643
Bostwick Steel Lath Co. 642
Consolidated Expanded Metal Cos. 645
General Fireproofing Bldg. Prod. Co. 181-688-705
C. G. Hussey & Co. 77
International Steel & Iron Co. 640-641
Milwaukee Corrugating Co. ..759-760-761-762
North Western Expanded Metal Co. 638-639
Rocbond Co. 683
Joseph T. Ryerson & Son, Inc. 522
Sykes Metal Lath Co. 187
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co. 636-637

LATH—FLOOR
Consolidated Expanded Metal Cos. 645
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co. 636-637

LATH—GYPSUM
Beaver Products Co., Inc. 494-495
U. S. Gypsum Co. 171-653

LATH—METAL
Associated Metal Lath Mfrs. 514
Bates Expanded Steel Truss Co. 643
Berger Mfg. Co. 185
Bostwick Steel Lath Co. 642
American Sheet & Tin Plate Co. 682
Consolidated Expanded Metal Co's. 645
Edwards Mfg. Co. 134
General Fireproofing Bldg. Prod. Co. 181-688-705
International Steel & Iron Co. 640-641
Milwaukee Corrugating Co. ..759-760-761-762
National Steel Fabrics Co. 182-183
New Jersey Wire Cloth Co. 488
North Western Expanded Metal Co. 638-639
Rocbond Co. 683
Joseph T. Ryerson & Son, Inc. 522
Sykes Metal Lath Co. 187
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co. 636-637

LATH—REINFORCING
Bates Expanded Steel Truss Co. 643
Bishopric Mfg. Co. 403-404
Berger Mfg. Co. 185
Bostwick Steel Lath Co. 642
Consolidated Expanded Metal Cos. 645
General Fireproofing Bldg. Prod. Co. 181-688-705
International Steel & Iron Co. 640-641
Milwaukee Corrugating Co. ..759-760-761-762
National Steel Fabrics Co. 182-183
North Western Expanded Metal Co. 638-639
Joseph T. Ryerson & Son, Inc. 522
Sykes Metal Lath Co. 187
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co. 636-637

LATH—ROPE
Hooven & Allison Co. 673

LATH—SHEATHING
Consolidated Expanded Metal Cos. 645
Flint Rock Stucco Co. 199
Shevlin, Carpenter & Clarke Co. 193
United States Gypsum Co. 171-653
Truscon Steel Co. 64-65-66-67-68-69

LATH—WIRE
National Steel Fabrics Co. 182-183
New Jersey Wire Cloth Co. 488
Joseph T. Ryerson & Son, Inc. 522
Wickwire Spencer Steel Co., Inc. 184

LATH—WOOD
California White & Sugar Pine Mfrs. Assn. 27
Flint Rock Stucco Co. 199
E. M. Long & Sons 31
Long-Bell Lbr. Co. 30
Red Cedar Lbr. Mfrs. Assn. 24
Shevlin, Carpenter & Clarke Co. 193
Western Pine Mfrs. Assn. 17

LATHES—WOODWORKING
American Saw Mill Machinery Co. ..574-575
W. F. & John Barnes Co. 620
W. B. & J. E. Boice 622
Ralph M. Kennedy 612
J. D. Wallace & Co. 570-571
Woodworkers Tool Works 615

LAVATORIES
Bowman Supply & Mfg. Co., Inc. 699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
Invisibowl Mfg. Corp. 710
B. Karol & Sons Co. 210-211
Mueller Co. 156

LAVATORIES—BUILT-IN
Invisibowl Mfg. Corp. 710

LETTERING MACHINES
Keuffel & Esser Co. 604-680
Wood-Regan Instrument Co. 426

LETTERS AND NUMBERS—METAL
Colonial Hardware Mfrs. 677
Greene, Tweed & Co. 712
Milwaukee Corrugating Co. ..759-760-761-762

LEVELS—CARPENTERS'
A. S. Aloe Co. 555-585-607
Empire Level Mfg. Co. 619
Geier & Bluhm, Inc. 617
Mayes Bros. 618
Stanley Works 34-35
L. S. Starrett Co. 602
Warren-Knight Co. 560
David White Co., Inc. 595
Wissler Instrument Co. 610

LEVELS—CONVERTIBLE
A. S. Aloe Company 555-585-607
American Blue Print Paper Co. 621
L. Beckmann Co. 593
Eugene Dietzgen Co. 600
Geier & Bluhm, Inc. 617
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc. 611
Stanley Works 34-35
L. S. Starrett Co. 602
Warren-Knight Co. 560
David White Co., Inc. 595
Wissler Instrument Co. 610

LEVELS—FARM
A. S. Aloe Company 555-585-607
American Blue Print Paper Co. 621
Eugene Dietzgen Co. 600
Geier & Bluhm, Inc. 617
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc. 611
Stanley Works 34-35
L. S. Starrett Co. 602
Warren-Knight Co. 560
David White Company, Inc. 595
Wissler Instrument Co. 610

LEVELS—LINE
A. S. Aloe Company 555-585-607
L. Beckmann Co. 593
Empire Level & Mfg. Co. 619
Frank B. Hall 561
L. S. Starrett Co. 602
E. A. Stevens 712
Warren-Knight Co. 560
David White Company, Inc. 595
Wissler Instrument Co. 610

LEVELS—MASONS'
A. S. Aloe Co. 555-585-607
Empire Level & Mfg. Co. 619
Geier & Bluhm, Inc. 617
Stanley Works 34-35
Warren-Knight Co. 560
David White Co., Inc. 595
Wissler Instrument Co. 610

LEVELS—SURFACE
E. A. Stevens 712

LIFTS—ASH
Highwood Dumbwaiter Co. 704
J. W. Kiesling & Sons 698
Sedgwick Machine Works 670

LIFTS—LOG
Highwood Dumbwaiter Co. 704
Sedgwick Machine Works 670

LIFTS—SASH
Frantz Mfg. Co. 3
Greene, Tweed & Co. 712
Griffin Mfg. Co. 691
H. B. Ives Co. 692
National Brass Co. 678
National Mfg. Co. 678
Stanley Works 34-35

LIFTS—TRANSOM
Greene, Tweed & Co. 712
Sargent & Co. 54-55

LIGHTING SYSTEMS—ELECTRIC
Fairbanks, Morse & Co. 150
Fuller & Johnson Mfg. Co. 620
Garden City Plating & Mfg. Co. 707
Klauer Mfg. Co. 717

LIGHTS—PRISM
International Steel & Iron Co. 640-641

LIGHTS—SIDEWALK
International Steel & Iron Co. 640-641

LIGHTS—VAULT
International Steel & Iron Co. 640-641

LIME—FINISHING
Ohio Hydrate & Supply Co. 650
Kelley Island Lime & Transport Co. 506-507
Woodville Lime Products Co. 419

LIME—LUMP
Kelley Island Lime & Transport Co. 506-507
Louisville Cement Co. 216
Ohio Hydrate & Supply Co. 650
U. S. Gypsum Co. 171-653
Woodville Lime Products Co. 419

LIME—PREPARED
Asbestos Shingle, Slate & Sheathing Co. 127
Louisville Cement Co. 216
Ohio Hydrate & Supply Co. 650
U. S. Gypsum Co. 171-653
Woodville Lime Products Co. 419

LINES—CLOTHES
Hooven & Allison Co. 673
Wickwire Spencer Steel Co., Inc. 184

LINING—CLOSET (Cedar)
Red Cedar Lbr. Mfrs. Assn. 24

LINING—FLUE
W. S. Dickey Clay Mfg. Co. 207
Johns-Manville, Inc. 401

LINING—WALL
The Barber Asphalt Co. 482-483
Insulite Co. 664
Invincible House Lining Co. 699
Standard Textile Prod. Co. 173

LINOLEUM
Armstrong Cork Co. 212
Armstrong Cork & Insulation Co. 168
Certain-teed Products Corp. 515
Albert Pick & Co. 169

LINTELS—STEEL
The Donley Bros. Co. 91
The General Fireproofing Bldg. Prod. Co. 181-688-705
International Steel & Iron Co. 640-641
David Lupton's Sons Co. 76
Northfield Iron Co. 712
Joseph T. Ryerson & Son, Inc. 522

LOCKS—DOOR
Colonial Hardware Mfrs. 677
Master Lock Co. 698
National Brass Co. 678
Paragon Keyless Lock Co. 706
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55

LOCKS—SASH
Barnes Lock & Sash Holder Co. 620
The Caldwell Mfg. Co. 704
Frantz Mfg. Co. 3
Hagstrom Mfg. Co. 696
Hardware Sales Co. 712
The H. B. Ives Co. 697
National Mfg. Co. 768
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55

LOCKS—VENTILATION
The H. B. Ives Co. 697

LOGS—GAS
Electric Fireplace Mfg. Co. 443
Otto E. Hansen & Sons 470
The Ohio Foundry & Mfg. Co. 94

LUGS—SILO
Joseph T. Ryerson & Son, Inc. 522

LUGS—TANK
Joseph T. Ryerson & Son, Inc. 522

LUMBER—ASBESTOS
American Insulation Co. 427-428-429
Asbestos Shingle, Slate & Sheathing Co. 127
The Philip Carey Co. 128-129
Johns-Manville, Inc. 401
Wonham, Bates & Goode Trading Corp. 412

LUMBER—CREOSOTED
Long-Bell Lbr. Co. 30

LUMBER—INSULATING
Philip Carey Co. 128-129
Celotex Co. 391
Salt Mountain Company 123-124-125-126
United States Gypsum Co. 171-653
Wonham, Bates & Goode Trading Corp. 412

LUMBER—METAL
Bates Expanded Steel Truss Co. 643
Berger Mfg. Co. 185
Truscon Steel Co. 64-65-66-67-68-69

LUMBER—WHOLESALE
Birch Mfrs. 680
California White & Sugar Pine Mfrs. Assn. 27
Elliott Bay Mill Co. 25
Gumwood Service Bureau 29
Hammond Cedar Co., Ltd. 446
Long-Bell Lbr. Co. 30
Red Cedar Lbr. Mfrs. Assn. 24
Shevlin, Carpenter & Clarke Co. 193
Western Pine Mfrs. Assn. 17
Whitney Co. 702

MALLETS—RUBBER
Everhot Mfg. Co. 469
Woodworkers Tool Works 615

MANTELS—BRICK
Colonial Fireplace Co. 90
Pioneer Fireplace Co. 676

MANTELS—CONCRETE
Electric Fireplace Mfg. Co. 443

MANTELS—MARBLE
Electric Fireplace Mfg. Co. 443

MANTELS—SLATE
Slatington-Bangor Slate Syndicate, Inc. 712
Structural Slate Co. 62

MANTELS—TILE
Associated Tile Mfrs. 449
Paul Bencoe 493
Colonial Fireplace Co. 90
Hornet Mantel & Tile Co. 93

MANTELS—WOOD
Colonial Fireplace Co. 90
Curtis Cos. Service Bureau 18
Gould Mfg. Co. 23
Hornet Mantel & Tile Co. 93
Long-Bell Lbr. Co. 30
Pioneer Fireplace Co. 676
Western Pine Mfrs. Assn. 17

MARBLE
International Steel & Iron Co.....640-641

MARBLE—ARTIFICIAL
Structural Slate Co..... 62
Vitrolite Co. 158

MARBLE—VITREOUS
Marietta Mfg. Co.....409
Vitrolite Co. 158

MARKERS—CEMENT
R. D. Swisher Mfg. Co.....618
Everhot Mfg. Co.....469

MARQUEES
International Steel & Iron Co.....640-641
Kawneer Co. 163
Klauer Mfg. Co.....717
Logan Co. 696
Milwaukee Corrugating Co..759-760-761-762

MILLWORK—WHOLESALE
Curtis Cos. Service Bureau..... 18
Farley & Loetschor Mfg. Co.....26-453
Gould Mfg. Co..... 23
Long-Bell Lbr. Co..... 30
Paine Lbr. Co., Ltd.....19-20-21-22
Roberts Sash & Door Co.....751-752-753

MILLWORK—STEEL
Majestic Steel Cabinet Co.....485

MITERING MACHINES
Combination Woodworking Machine Co.587
De Walt Products Co.....576-577
J. D. Wallace & Co.....570-571

MITERS—COPPER
C. G. Hussey & Co..... 77
Klauer Mfg. Co.....717
David Lupton's Sons Co..... 76

MIXERS—CONCRETE (Batch)
A. S. Aloe Company.....555-585-607
American Cement Machine Co.....557
Anchor Concrete Machinery Co.....594
Atlas Engineering Co.....617-620
Chain Belt Co..... 2
Concrete Equipment Co.....530-531
Construction Machinery Co.....546-547
W. E. Dunn Mfg. Co.....527-528-529
J. B. Foote Fdry. Co.....601
Ideal Concrete Machinery Co.....532-533
Kiel Mixer Co.....558
Knickerbocker Co. 594
Koehring Company 563
Kwik Mix Concrete Mixer Co.....556
Lansing Company 548-549
Northfield Iron Co.....712
Peerless Machinery Co.....606
Orr & Sembower, Inc.....610
Raber & Lang Mfg. Co.....554
Ransome Concrete Machinery Co.....596
Remmel Mfg. Co.....596
Sheldon Mfg. Co., Inc.....622
T. L. Smith Co.....518-519
Standard Scale & Sup. Corp.....559
Stewart Mfg. Co.....560-561

MIXERS—CONCRETE (Continuous)
Anchor Concrete Machinery Co.....594
Chain Belt Co..... 2
B. M. Cropp Co.....619
J. B. Foote Fdry. Co.....601
Kiel Mixer Co.....558
Lansing Company 548-549
Miles Mfg. Co.....590
Raber & Lang Mfg. Co.....554

MIXERS—MORTAR AND PLASTER
A. S. Aloe Company.....555-585-607
Atlas Engineering Co.....617-620
C. H. & E. Mfg. Co., Inc.....582
Concrete Equipment Co.....530-531
Construction Machinery Co.....546-547
J. B. Foote Foundry Co.....601
Kiel Mixer Co. 558
Knickerbocker Co. 594
Kwik Mix Concrete Mixer Co.....556
Lansing Company 548-549
Northfield Iron Co.....712
Peerless Machinery Co.....606
Ransome Concrete Machinery Co.....596
Remmel Mfg. Co.....596
Standard Scale & Supply Corp.....559
Stewart Mfg. Co.....560-561

MOLDS—BLOCK (Cement)
Abram Cement Tool Co.....562
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
Flexo Concrete Mold Co.....622
J. B. Foote Fdry. Co.....601
Ideal Concrete Machinery Co.....532-533
Kwik-Mix Concrete Mixer Co.....556
Multiplex Concrete Machinery Co.....592
Raber & Lang Mfg. Co.....554

MOLDS—BRICK (Cement)
Anchor Concrete Machinery Co.....594
J. B. Foote Fdry. Co.....601
Ideal Concrete Machinery Co.....532-533
Raber & Lang Mfg. Co.....554

MOLDS—CHIMNEY (Cement)
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601
Ideal Concrete Machinery Co.....532-533
Multiplex Concrete Machinery Co.....592
Van Guilder System Concrete Bldg. Inc. 564-565

MOLDS—COLUMN (Cement)
Anchor Concrete Machinery Co.....594
J. B. Foote Foundry Co.....601
Hartmann-Sanders Co. 28
Ideal Concrete Machinery Co.....532-533
Van Guilder System Concrete Bld., Inc. 564-565

MOLDS—DRAIN TILE (Cement)
Concrete Equipment Co.....530-531
Ideal Concrete Machinery Co.....532-533
Raber & Lang Mfg. Co.....554

MOLDS—FENCE POST (Cement)
J. B. Foote Fdry. Co.....601

MOLDS—CEMENT FENCE POST
Kwik-Mix Concrete Mixer Co.....556
Raber & Lang Mfg. Co.....554

MOLDS—ORNAMENT (Cement)
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601
Ideal Concrete Machinery Co.....532-533

MOLDS—SEWER PIPE (Cement)
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601
Metal Forms Corp.....561
Raber & Lang Mfg. Co.....554

MOLDS—SILO (Cement)
Anchor Concrete Machinery Co.....594
J. B. Foote Foundry Co.....601
Metal Forms Corp.....561
Van Guilder System Concrete Bldg., Inc. 564-565

MOLDS—STEP (Cement)
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601

MORTAR
Carney Co. 395
Louisville Cement Company.....216

MORTAR—BRICK
Carney Co. 395
Louisville Cement Co.....216
Woodville Lime Products Co.....419

MORTAR—HOLLOW TILE
Carney Company 395
Louisville Cement Co.....216

MORTAR—LIME
Ohio Hydrate & Supply Co.....650
Woodville Lime Products Co.....419

MORTISERS—DOOR LOCK
Colgan Machinery & Supply Co.....608
De Walt Products Co.....576-577
Perfection Mortiser Co.....622

MORTISING MACHINES
American Saw Mill Machinery Co...574-575
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
DeWalt Products Co.....576-577
Gallmeyer & Livingston Co.....586
Kornau Machine Co.....612
Perfection Mortiser Co.....622
J. D. Wallace & Co.....570-571

MOSAICS
Associated Tile Mfrs.....449

MOTORS—ELECTRIC
Century Electric Co.....690
Duro Pump & Mfg. Co.....148
Fairbanks, Morse & Co.....150
General Electric Co. 432-433-434-435-436-437-438-439-440-441
Ralph M. Kennedy.....693

MOULDINGS—BASE (Metal)
Bostwick Steel Lath Co.....642
Consolidated Expanded Metals Cos.....645
Edwards Mfg. Co.....134
Kawneer Co. 163
Milwaukee Corrugating Co..759-760-761-762
Morton Mfg. Co.....79
National Metal Molding Co.....444

MOULDINGS—BASE (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co..... 23
Long Bell Lbr. Co..... 30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17

MOULDINGS—METAL
Brasco Mfg. Co.....161
Consolidated Expanded Metal Cos.....645
Kawneer Co. 163
Milwaukee Corrugating Co..759-760-761-762
Morton Mfg. Co.....79
Zouri Drawn Metals Co.....8-9

MOULDINGS—PICTURE
Bostwick Steel Lath Co.....642
California White & Sugar Pine Mfrs. Assn. 27
Curtis Cos. Service Bureau..... 18
Gould Mfg. Co..... 23
Hammond Cedar Co., Ltd.....446
Kawneer Co. 163
Long-Bell Lbr. Co..... 30
Milwaukee Corrugating Co..759-760-761-762
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17
Youngstown Pressed Steel Co.....636-637

MOULDINGS—TILE
Associated Tile Mfrs.....449

MOULDINGS—WOOD
Andersen Lbr. Co.....194
Arkansas Oak Flooring Co.....679
California White & Sugar Pine Mfrs. Assn. 27
Curtis Cos. Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co..... 23
Hammond Cedar Co., Ltd.....446
E. M. Long & Sons..... 31
Long-Bell Lbr. Co..... 30
Red Cedar Lbr. Mfrs. Assn..... 24
Roberts Sash & Door Co.....751-752-753
Shevlin, Carpenter & Clarke Co.....193
Western Pine Mfrs. Assn..... 17

NAILS—CLAMP
American Steel & Wire Co.....186
Wickwire Spencer Steel Co., Inc.....184

NAILS—CUT
T. Thompson Ladder Co.....708

NAILS—GALVANIZED
American Steel & Wire Co.....186
Moeschel Edwards Corrugating Co.....674
National Lock Co.....686
Rocbond Co. 683
Wickwire Spencer Steel Co., Inc.....184

NAILS—MASONRY
Parker-Kalon Corp. 516

NAILS—ROOFING
American Steel & Wire Co.....186
Beckman-Dawson Roofing Co.....132
Philip Carey Co.....128-129
Edwards Mfg. Co.....134
C. G. Hussey & Co..... 77
Logan-Long Co. 133
Moeschl Edwards Corr. Co.....674
National Lock Co.....686
Ruberoid Co. 486-487

NAILS—ZINC
Ruberoid Co. 486-487
Weatherbest Stained Shingle Co., Inc. 130-131

NETTING—WIRE
American Steel & Wire Co.....186
Gilbert & Bennett Mfg. Co.....513
New Jersey Wire Cloth Co.....488
Wickwire Spencer Steel Co., Inc.....184

NEWELS—METAL
Logan Co. 696

OAKUM
Hooven & Allison Co.....673

OPENERS—DOOR (Electric)
Allith-Prouty Co. 46-47
Richards-Wilcox Mfg. Co.....10-11

OPENERS—GARAGE DOOR
Allith-Prouty Co. 46-47
Richards-Wilcox Mfg. Co.....10-11

OPERATORS—SASH
Casement Hardware Co..... 38
International Steel & Iron Co.....640-641
Richards-Wilcox Mfg. Co.....10-11
Joseph T. Ryerson & Son, Inc.....522
Sargent & Company.....54-55

OPERATORS—CONCEALED TRANSOM
W. E. Putnam Co.....696

ORNAMENTS—COMPOSITION
Vitrolite Co. 158

ORNAMENTS—SHEET METAL
Edwards Mfg. Co.....134
Manhattan Perforated Metal Co., Inc..713
Milwaukee Corrugating Co..759-760-761-762

ORNAMENTS—WOOD
Ornamental Products Co.....714

ORNAMENTS—ZINC
Edwards Mfg. Co.....134
Milwaukee Corrugating Co..759-760-761-762

OUTLETS—EAVES TROUGH
Edwards Mfg. Co.....134
C. G. Hussey & Co..... 77
Klauer Mfg. Co. 717
Messenger & Parks Mfg. Co.....717
Milwaukee Corrugating Co..759-760-761-762
Moeschl Edwards Corr. Co.....674
New Jersey Zinc Sales Co., Inc.....420

OUTLETS—ELECTRIC
General Electric Co. 432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

PAINT PASTE—ZINC
Certain-teed Products Corp.....515
Martin-Senour Co. 767
Sherwin-Williams Co. 393
Toch Brothers 711
Truscon Steel Co.....64-65-66-67-68-69

PAINTS—ASPHALT
Amalgamated Roofing Co.....669
Barber Asphalt Co.....482-483
Beaver Products Company, Inc.....494-495
Beckman-Dawson Roofing Co.....132
Philip Carey Co.....128-129
Certain-teed Products Corp.....515
Chatfield Mfg. Co.....157
Martin-Senour Co. 767
B. F. Nelson Mfg. Co.....406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co.....123-124-125-126
Solvay Process Co.....63
Sherwin-Williams Co. 393
Toch Brothers 711
Truscon Laboratories 70-71
Truscon Steel Co.....64-65-66-67-68-69

PAINTS—BARN
Samuel Cabot, Inc. 491
Certain-teed Products Corp. 515
Farley & Loetscher Mfg. Co. 26-453
Kalamazoo Tank & Silo Co. 201
Martin-Senour Co. 767
Sherwin-Williams Co. 393
Toch Brothers 711
Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69

PAINTS—CEMENT AND STUCCO
Reardon Co. 72
Sandusky Cement Co. 192

PAINTS—HOUSE
Samuel Cabot, Inc. 491
Certain-teed Products Corp. 515
Farley & Loetscher Mfg. Co. 26-453
Martin-Senour Co. 767
Sherwin-Williams Co. 393
Toch Brothers Co. 711
Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69
U. S. Gypsum Co. 171-653

PAINTS—METAL
Sherwin-Williams Co. 393

PAINTS—WATER
Reardon Co. 72

PAINTS—WATERPROOFING
Anti-Hydro Waterproofing Co. 681-684
Barber Asphalt Co. 482-483
Beckman-Dawson Roofing Co. 132
Samuel Cabot, Inc. 491
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Donley Bros. Co. 91
Martin-Senour Co. 767
B. F. Nelson Mfg. Co. 406
Reardon Co. 72
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Solvay Process Co. 63
Sherwin-Williams Co. 393
Toch Brothers 711
Truscon Laboratories 70-71
Truscon Steel Co. 64-65-66-67-68-69

PAINT SPRAYING MACHINES
Binks Spray Equipment Co. 588
DeVilbiss Mfg. Co. 616
Spray-Lac Mfg. Co. 567
Spray Painting & Finishing Equip. Sales Co. 708

PANELS—PLYWOOD
Elliott Bay Mill Co. 25
Long-Bell Lumber Co. 30
Paine Lumber Co., Ltd. 19-20-21-22
Wheeler Osgood Co. 175-176

PAPER—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co. 127
Philip Carey Co. 128-129
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co. 113
Johns-Manville, Inc. 401
L. J. Mueller Furnace Co. 103-104-105
Sall Mountain Company 123-124-125-126

PAPER—BLUEPRINT
A. S. Aloe Company 555-585-607
American Blue Print Paper Co. 621
Eugene Dietzgen Co. 600
Kueffel & Esser Co. 604-680
B. L. Makepeace, Inc. 611
New York Blue Print Paper Co. 699
Warren-Knight Co. 560

PAPER—BUILDING
American Reenforced Paper Co. 164-165
Barber Asphalt Co. 482-483
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Farley & Loetscher Mfg. Co. 26-453
Johns-Manville, Inc. 401
Kalamazoo Vegetable Parchment Co. 167
Logan-Long Co. 133
Moeschl Edwards Corrugating Co. 674
B. F. Nelson Mfg. Co. 406
Ruberoid Co. 486-487

PAPER—DRAWING
A. S. Aloe Company 555-585-607
American Blue Print Paper Co. 621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc. 611
New York Blue Print Paper Co. 699
Warren-Knight Co. 560

PAPER—GARNET
American Floor Surfacing Machine Co. 475

PAPER—INSULATING
Airinsulate Company 218
American Reenforced Paper Co. 164-165
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Samuel Cabot, Inc. 491
Philip Carey Co. 128-129
Certain-teed Products Co. 515
Chatfield Mfg. Co. 157
Farley & Loetscher Mfg. Co. 26-453
Johns-Manville, Inc. 401
Kalamazoo Vegetable Parchment Co. 167
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Sall Mountain Co. 123-124-125-126

PARTITIONS—ASBESTOS WOOD
Asbestos Shingle, Slate & Sheathing Co. 127
Philip Carey Co. 128-129
Johns-Manville, Inc. 401
Sall Mountain Co. 123-124-125-126
Wonham, Bates & Goode Trading Corp. 413

PARTITIONS—HOLLOW TILE
Hoosier Building Tile & Silo Co. 202-203
Kalamazoo Tank & Silo Co. 201
National Fire Proofing Co. 205
U. S. Gypsum Co. 171-653

PARTITIONS—EXPANDED METAL
Youngstown Pressed Steel Co. 636-637

PARTITIONS—METAL
Edwards Mfg. Co. 134
David Lupton's Sons Co. 76
Moeschl Edwards Corrugating Co. 674
Truscon Steel Co. 64-65-66-67-68-69
Henry Weis Mfg. Co. 78

PARTITIONS—METAL LATH
Youngstown Pressed Steel Co. 636-637

PARTITIONS—ROLLING AND FOLDING
Edwards Mfg. Co. 134
Moeschl Edwards Corrugating Co. 674
Roberts Sash & Door Co. 751-752-753

PARTITIONS—SLATE
Knickerbocker Slate Corp. 709
Slatington Slate Co. 714
Slatington-Bangor Slate Syndicate, Inc. 712
Structural Slate Co. 62

PARTITIONS—WIRE
Cincinnati Iron Fence Co. 691
Logan Co. 696
Wickwire Spencer Steel Co., Inc. 184

PARTITIONS—WOOD
Gould Mfg. Co. 23
Long-Bell Lbr. Co. 30
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17

PAVERS—CONCRETE
American Cement Machine Co. 621
Chain Belt Co. 2
Construction Machinery Co. 546-547
Ransome Concrete Machinery Co. 596
T. L. Smith Co. 518-519

PAVING—TILE
Associated Tile Mfrs. 449

PEBBLE DASH
Flint Rock Stucco Co. 190
Mac Stone Stucco Co., Inc. 694
C. K. Williams & Co. 680

PEBBLE DASH SPRAY MACHINES
Stevens Pneumatic Machine Co. 606

PEDS
General Fireproofing Building Products Co. 181-688-705

PENCILS—DRAFTING
A. S. Aloe Co. 555-585-607
American Blue Print Paper Co. 621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc. 611
Warren-Knight Co. 560

PERGOLAS
Edwards Mfg. Co. 134
Farley & Loetscher Mfg. Co. 26-453
Hammond Cedar Co., Ltd. 446
Hartmann-Sanders Co. 28
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17

PIPE—CHIMNEY (Vitrified Clay)
W. S. Dickey Clay Mfg. Co. 207

PIPE—CONDUCTOR (Copper)
Edwards Mfg. Co. 134
C. G. Hussey & Co. 77
Klauer Mfg. Co. 717
David Lupton's Sons Co. 76
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674

PIPE CONDUCTOR (Sheet Metal)
Edwards Mfg. Co. 134
Heltzel Steel Form & Iron Co. 621
Klauer Mfg. Co. 717
David Lupton's Sons Co. 76
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674
L. J. Mueller Furnace Co. 103-104-105
New Jersey Zinc Sales Co., Inc. 420
Wheeling Metal & Mfg. Co. 136

PIPE—CONDUCTOR (Zinc)
New Jersey Zinc Sales Co., Inc. 420

PIPE—CULVERT (Vitrified Clay)
W. S. Dickey Clay Mfg. Co. 207

PIPE—FURNACE
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc. 699
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co. 113
Hess Warming & Ventilating Co. 116-713
Homer Furnace Co. 717
International Heater Co. 115
B. Karol & Sons Co. 210-211
Milwaukee Corrugating Co. 759-760-761-762
L. J. Mueller Furnace Co. 103-104-105
Sall Mountain Co. 123-124-125-126
Stanley Plumbing Supply Co., Inc. 703

PIPE—IRRIGATION (Vitrified Clay)
W. S. Dickey Clay Mfg. Co. 207

PIPE—PLUMBING (Brass)
Bowman Supply & Mfg. Co., Inc. 699
Chase Metal Works 162
Copper & Brass Research Assn. 478
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
Mueller Co. 156
L. J. Mueller Furnace Co. 103-104-105
Stanley Plumbing Supply Co., Inc. 703

PIPE—PLUMBING (Copper)
Bowman Supply & Mfg. Co. 699
Chase Metal Works 162
Crane Co. 154
Mueller Co. 156
Stanley Plumbing Supply Co., Inc. 703

PIPE—SEWER
Clay Products Assn. 688
Crane Co. 154
W. S. Dickey Clay Mfg. Co. 207
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co. 210-211
T. Thompson Ladder Co. 708

PIPE—SPLIT (Vitrified Clay)
W. S. Dickey Clay Mfg. Co. 207

PIPE—STOVE
International Heater Co. 115
Milwaukee Corrugating Co. 759-760-761-762
L. J. Mueller Furnace Co. 103-104-105

PIPE—WELL (Vitrified Clay)
W. S. Dickey Clay Mfg. Co. 207

PIVOTS—DOOR (Ball Bearing)
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55

PLANERS—ROOF
Wm. Bierman 712

PLANERS—WOOD (Power)
American Saw Mill Machinery Co. 574-575
The Crescent Machine Co. 568-569
Gallmeyer & Livingston Co. 586
Hutchinson Mfg. Co., Inc. 581
Jones Superior Machine Co. 598

PLANERS—WOOD (Power)
Ralph M. Kennedy 612

PLANES—CARPENTERS
Sargent & Co. 54-55
Stanley Works 34-35

PLANS—BUILDING
Common Brick Mfrs. Assn. 415-416-417
Hunt-Helm-Ferris & Co. 39-40-41-42
Long-Bell Lbr. Co. 30
G. L. Miller & Co. 397
Radford Architectural Co. 119-120-121-122
E. W. Stillwell & Co. 713

PLASTER—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co. 127
Philip Carey Co. 128-129
Sall Mountain Co. 123-124-125-126

PLASTER—GYPSUM
Certain-teed Products Corp. 515

PLASTER—INTERIOR
Beaver Products Co., Inc. 494-495
Certain-teed Products Corp. 515
Rocbond Co. 683
Ohio Hydrate & Supply Co. 650
U. S. Gypsum Co. 171-653
Universal Gypsum Co. 661
Woodville Lime Products Co. 419

PLASTER—OXY-CHLORIDE
Flint Rock Stucco Co. 190
Mac Stone Stucco Co., Inc. 694
Rocbond Co. 683

PLASTER—STUCCO MAGNESIA
Bishopric Co. 403-404
Certain-teed Products Corp. 515
Flint Rock Stucco Co. 190
Mac Stone Stucco Co., Inc. 694
Rocbond Co. 683
U. S. Materials Co. 466-467

PLASTERBOARD
The Beaver Products Co., Inc. 494-495
U. S. Gypsum Co. 171-653
Universal Gypsum Co. 661

PLATES—CEILING
Marietta Mfg. Co. 400

PLATES—DOOR
Brasco Mfg. Co. 161
Central Specialty Mfg. Co. 715
Colonial Hardware Mfrs. 677
Frantz Mfg. Co. 3
Greene, Tweed & Co. 712
McKinney Mfg. Co. 48
Vitrolite Co. 158

PLATES—FLOOR (Composition)
Paul Bencoe 493

PLATES—FLOOR (Steel)
Heltzel Steel Form & Iron Co. 621
Morton Mfg. Co. 79

PLATES—ROOF (Composition)
Paul Bencoe 493

PLATES—STACK (Steel)
Heltzel Steel Form & Iron Co. 621

PLATES—SWITCH (Floor)
General Electric Co. 432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co. 448

PLATES—TANK (Steel)
Heltzel Steel Form & Iron Co. 621
Inland Steel Co. 88

PLATES—WALL
Crane Co. 154

PLUGS—ATTACHMENT
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448
Ralph M. Kennedy 612

PLUGS—FUSE
American Radiator Co. 106-107-476-477
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

PLUGS—FLUSH RECEPTACLE
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

PLUGS—SCREW
Hart & Hegeman Mfg. Co.....448

PLUGS—WALL
Bostwick Steel Lath Co.....642
Donley Bros. Co. 91
Hart & Hegeman Mfg. Co.....448

PLUMBS
Eugene Dietzgen Co. 600
Henry Disston & Sons.....399
Keuffel & Esser Co. 604-690
Stanley Works 34-35
L. S. Starrett Co.....602
Warren-Knight Co. 560

POLISHING MACHINES—FLOOR (Electric)
American Floor Surfacing Mach. Co...475

POSTS—CLOTHES
Cincinnati Iron Fence Co.....691
Donley Bros. Co. 91

POSTS—FENCE
American Steel & Wire Co.....186
Cincinnati Iron Fence Co.....691
Inland Steel Co. 83
Long-Bell Lbr. Co. 39
Structural Slate Co. 62
Western Pine Mfrs. Assn..... 17

POWER TAKEOFF MACHINES
Jaeger Portable Power Corp.....620

PRESERVATIVES—WOOD
Samuel Cabot, Inc. 491
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Martin-Senour Company 767
Sherwin-Williams Co. 393
Toch Brothers 711

PROTRACTORS
A. S. Aloe Co. 555-585-607
Keuffel & Esser Co. 604-690
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co. 560

PULLERS—NAIL
Chas. Morrill, Inc. 714
Stanley Works 34-35

PULLEYS—CEILING
Sargent & Co. 54-55

PULLEYS—SASH
Grand Rapids Hardware Co.....707
National Lock Co. 686
Sargent & Co. 54-55
Stanley Works 34-35

PULLING MACHINES
John Waldron Corp. 566

PULLS—DOOR
Allith-Prouty Co. 46-47
Frantz Mfg. Co. 3
H. B. Ives Co.....692
J. E. Porter Corp..... 50
Richards-Wilcox Mfg. Co. 10-11
Sargent & Co. 54-55
Stanley Works 34-35

PUMPS—CONTRACTORS
C. H. & E. Mfg. Co., Inc.....582
Construction Machinery Co. 546-547
Jaeger Portable Power Corp.....620
The F. E. Myers & Bro. Co.....146-147
Novo Engine Company 604
Geo. D. Roper Corp.....465
Standard Scale & Supply Corp.....559

PUMPS—DRAIN
Duro Pump & Mfg. Co.....148
Fairbanks, Morse & Co.....150
Kwik-Mix Concrete Mixer Co.....556
Geo. D. Roper Corp.....465
Standard Scale & Supply Co.....559

PUMPS—ELECTRIC
Dayton Pump & Mfg. Co.....683
Duro Pump & Mfg. Co.....148
Hardin-Lavin Co. 755-756-757-766
Kewanee Private Utilities Co.....711
Monarch Engineering Co. 152
The F. E. Myers & Bro. Co.....146-147
Novo Engine Co. 604
Geo. D. Roper Corp.....465
Standard Scale & Supply Corp.....559
Valle-Kimes Co. 153

PUMPS—FORCE
Duro Pump & Mfg. Co.....148
Fuller & Johnson Mfg. Co.....620
B. Karol & Sons Co.....210-211
The F. E. Myers & Bro. Co.....146-147
Novo Engine Co. 604
Geo. D. Roper Corp.....465

PUMPS—GASOLINE
C. H. & E. Mfg. Co., Inc.....582
Dayton Pump & Mfg. Co.....683
Fuller & Johnson Mfg. Co.....620
Kiel Mixer Co. 558
Klauer Mfg. Co. 717
The F. E. Myers & Bro. Co.....146-147
Novo Engine Co. 604
Geo. D. Roper Corp.....465
Standard Scale & Supply Corp.....559

PUMPS—HOUSE
Dayton Pump & Mfg. Co.....683
Duro Pump & Mfg. Co.....148
Ft. Wayne Eng. & Mfg. Co.....149
Fuller & Johnson Mfg. Co.....620
Hardin-Lavin Co. 755-756-757-766
Kewanee Private Utilities Co.....711
Monarch Engineering Co. 152
The F. E. Myers & Bro. Co.....146-147
Geo. D. Roper Corp.....465
Valle-Kimes Co. 153

PUMPS—STEAM
Fairbanks, Morse & Co.....150

PUTTY—METAL SASH
William Bayley Co. 73
Detroit Steel Products Co.....74-75
Donley Bros. Co. 91
H. B. Fred Kuhls.....685
Martin-Senour Co. 767
Sherwin-Williams Co. 393
Truscon Laboratories 70-71

PUTTY—ROOFING
Asbestos Shingle, Slate & Sheathing Co.127
Barber Asphalt Co. 482-483
Beckman-Dawson Roofing Co. 132
Certain-teed Products Corp. 515
Feder-Schwartz Process Co. 704
Johns-Manville, Inc. 401
H. B. Fred Kuhls.....685
Sail Mountain Co. 123-124-125-126
Sherwin-Williams Co. 393

RADIATORS—GAS
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc.....699
Ohio Foundry & Mfg. Co. 94
Stanley Plumbing Supply Co., Inc.....703

RADIATORS—HOT AIR
Bowman Supply & Mfg. Co., Inc.....699
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co.....113
L. J. Mueller Furnace Co.....103-104-105
Stanley Plumbing Supply Co., Inc.....703

RADIATORS—HOT WATER
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co.....699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
L. J. Mueller Furnace Co.....103-104-105
Stanley Plumbing Supply Co., Inc.....703
U. S. Radiator Corp.....114

RADIATORS—STEAM
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc.....699
Crane Co. 154
Hardin-Lavin Co. 755-756-757-766
B. Karol & Sons Co.....210-211
L. J. Mueller Furnace Co.....103-104-105
Stanley Plumbing Supply Co., Inc.....703
U. S. Radiator Corp.....114

RAILINGS—BRASS
Bowman Supply & Mfg. Co., Inc.....699
Brasco Mfg. Co. 161
Cincinnati Iron Fence Co.....691
Crane Co. 154
Garden City Plating & Mfg. Co.....707
Kawneer Co. 163
International Steel & Iron Co.....640-641
Logan Co. 696
Wickwire Spencer Steel Co., Inc.....184

RAILINGS—IRON
Cincinnati Iron Fence Co.....691
Crane Co. 154
Garden City Plating & Mfg. Co.....707
International Steel & Iron Co.....640-641
B. Karol & Sons Co.....210-211
Kwik-Mix Concrete Mixer Co.....556
Logan Co. 696
Wickwire Spencer Steel Co., Inc.....184

RAILINGS—PIPE
Cincinnati Iron Fence Co.....691
Garden City Plating & Mfg. Co.....707
Heltzel Steel Form & Iron Co.....621
International Steel & Iron Co.....640-641
B. Karol & Sons Co.....210-211
Logan Co. 696
Stanley Plumbing Supply Co., Inc.....703

RAILINGS—WIRE
Cincinnati Iron Fence Co.....691
International Steel & Iron Co.....640-641
Logan Co. 696

RAILS—BARNDOOR
Frantz Mfg. Co. 3
McKinney Mfg. Co. 48
J. E. Porter Corp..... 50
Richard-Wilcox Mfg. Co. 10-11
Stanley Works 34-35

RAILS—PORCH
Cincinnati Iron Fence Co.....691
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Roberts Sash & Door Co.....751-752-753

RAILS—STAIR (Bronze)
Kawneer Co. 163

RANGES—COAL
Thatcher Co. 663

RANGES—ELECTRIC
"White" Door Bed Co.....169

RANGES—GAS
A. B. Stove Co.....458-459
American Gas Assn. 457
American Heating & Lighting Co.....473
American Stove Co. 460
Beckwith Co. 108-109
Ohio State Stove & Mfg. Co.....462-463
Peerless Mfg. Co. 88-89
Quad Stove Mfg. Co.....692
Geo. D. Roper Corp.....465
Thatcher Co. 663
"White" Door Bed Co. 169

RECEIVERS—ASH (Rotary)
Sharp Rotary Ash Receiver Co.....676

REAMERS
Hardin-Lavin Co. 755-756-757-766
Joseph T. Ryerson & Son, Inc.....522

RECEIVERS—GARBAGE
H. W. Covert Co.....695
Donley Bros. Co. 91
International Steel & Iron Co.....640-641
Klauer Mfg. Co. 717
Majestic Co. 96
Peerless Mfg. Co. 88-89
Sharp Rotary Ash Receiver Co.....676
Willis Mfg. Co. 85

RECEIVERS—PACKAGE
H. W. Covert Co.....695
Donley Bros. Co. 91
Majestic Co. 96
Peerless Mfg. Co. 88-89

RECEIVERS—SHOWER
Bowman Supply & Mfg. Co., Inc.....699

RECEPTACLES—CONDUIT BOX
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

RECEPTACLES—FLOOR
General Electric Co. .....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448

REFRIGERATORS
Continental Steel Products Co..... 80
Gurney Regrigerator Co. 7-145
Herrick Refrigerator & C. S. Co.....144
Kozy Kitch Kitchenet Co.....701
Majestic Steel Cabinet Co.....485
McCray Refrigerator Co. 142-143
Roberts Sash & Door Co.....751-752-753
Wasmuth-Endicott Co. 178-179

REFRIGERATORS—ICELESS
Delco-Light Co. 715
Sedgwick Machine Works 670
Willis Mfg. Co. 85

REFRIGERATION—ELECTRIC
W. B. Wilde Co.....117

REGISTERS—FLOOR
Auer Register Co. 700
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co.....113
Hess Warming & Ventilating Co....116-713
Homer Furnace Co. 717
B. Karol & Sons Co.....210-211
Majestic Co. 96
Milwaukee Corrugating Co.759-760-761-762
L. J. Mueller Furnace Co.....103-104-105
Rock Island Register Co.....110
Rybolt Heater Co.....479

REGISTERS—PIPELESS FURNACE
Rock Island Register Co.....110
Rybolt Heater Co.....479

REGISTERS—WALL
Auer Register Co. 700
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co.....113
Homer Furnace Co. 717
B. Karol & Sons Co.....210-211
Majestic Co. 96
Manhattan Perforated Metal Co., Inc...713
Milwaukee Corrugating Co.759-760-761-762
L. J. Mueller Furnace Co.....103-104-105
Rock Island Register Co.....110
Rybolt Heater Co.....479

REGULATORS—FURNACE
American Thermostat Co. 705
Bowman Supply & Mfg. Co., Inc.....699
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co.....113
Homer Furnace Co. 717
Majestic Co. 96
L. J. Mueller Furnace Co.....103-104-105
Rybolt Heater Co.....479

REGULATORS—HEAT
American Thermostat Co. 705
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc.....699
Hardin-Lavin Co. 755-756-757-766
Henry Furnace & Foundry Co.....113
Majestic Co. 96
L. J. Mueller Furnace Co.....103-104-105
Rybolt Heater Co.....479
U. S. Radiator Corp.....114

REGULATORS—OVEN HEAT
American Gas Assn. 457
American Stove Co. 460

REGULATORS—TEMPERATURE
American Radiator Co. 106-107-476-477
American Thermostat Co. 705
Bowman Supply & Mfg. Co., Inc. 699
Henry Furnace & Foundry Co. 113
Homer Furnace Co. 717

REGULATORS—WATER (Automatic)
American Radiator Co. 106-107-476-477
Bowman Supply & Mfg. Co., Inc. 699
Monarch Engineering Co. 152
Mueller Co. 156
U. S. Radiator Corp. 114

REINFORCING
American Steel & Wire Co. 186
Bishopric Mfg. Co. 403-404
International Steel & Iron Co. 640-641
National Steel Fabrics Co. 182-183
Northfield Iron Co. 712
North Western Expanded Metal Co. 638-639
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69
Wickwire Spencer Steel Co., Inc. 184
Youngstown Pressed Steel Co. 636-637

REMOVERS—EFFLORESCENCE
Truscon Laboratories 70-71

REMOVERS—PAINT AND VARNISH
Certain-teed Products Corp. 515
S. C. Johnson & Son. 486-487
Martin-Senour Co. 767
Sherwin-Williams Co. 393
Spray-Lac Mfg. Co. 567

RESAW-MACHINES
Jones Superior Machine Co. 598
Ralph M. Kennedy 612
Woodworkers Tool Works 615

RESISTANTS—ACID (For Concrete)
Anti-Hydro Waterproofing Co. 681-684
Feder-Schwartz Process Co. 704
General Fireproofing Building Products Company 181-688-705
Toch Brothers 711
Truscon Steel Co. 64-65-66-67-68-69

RIDGING—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co. 127

RIVETS—COPPER
Heltzel Steel Form & Iron Co. 621
C. G. Hussey & Co. 77
Kawneer Co. 163
Progressive Mfg. Co. 706

RIVETS—STEEL
Inland Steel Co. 83
International Steel & Iron Co. 640-641
Progressive Mfg. Co. 706
Joseph T. Ryerson & Son, Inc. 522

RODS—BRASS
Central Specialty Mfg. Co. 715
Chase Metal Works 162
Garden City Plating & Mfg. Co. 707
Kawneer Co. 163

RODS—COPPER
Kawneer Co. 163

RODS—LEVELLING
Eugene Dietzgen Co. 600

RODS—LIGHTNING
L. F. Diddie Co. 681
T. Thompson Ladder Co. 708

RODS—SILO
Kalamazoo Tank & Silo Co. 201
Joseph T. Ryerson & Son, Inc. 522

ROLLERS—BARN DOOR
Allith-Prouty Co. 46-47
Frantz Mfg. Co. 3
Hunt-Helm-Ferris & Co. 39-40-41-42
McKinney Mfg. Co. 48
J. E. Porter Corp. 50
Richards-Wilcox Mfg. Co. 10-11
Stanley Works 34-35
Wagner Mfg. Co. 53

ROLLERS—HOUSE DOOR
Allith-Prouty Co. 46-47
Richards-Wilcox Mfg. Co. 10-11
Wagner Mfg. Co. 53

ROOF CONSTRUCTION—WOODEN
Lamella Roof Syndicate 672

ROOFING—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co. 127
Philip Carey Co. 128-129
Feder-Schwartz Process Co. 704
Johns-Manville, Inc. 401
Wonham, Bates & Goode Trading Corp. 413

ROOFING—ASBESTOS SHINGLES
American Insulation Co. 427-428-429
Asbestos Shingle, Slate & Sheathing Co. 127
Philip Carey Co. 128-129
Johns-Manville, Inc. 401
National Sheet Metal Roofing Co. 711
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Wonham, Bates & Goode Trading Corp. 413

ROOFING—ASPHALT (Ready)
Amalgamated Roofing Co. 669
American Insulation Co. 427-428-429
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Farley & Loetscher Mfg. Co. 26-453
Ford Roofing Products Co. 712
Johns-Manville, Inc. 401
Logan-Long Co. 133
National Sheet Metal Roofing Co. 711
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—ASPHALT SHINGLES
Amalgamated Roofing Co. 669
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Farley & Loetscher Mfg. Co. 26-453
Ford Roofing Products Co. 712
Johns-Manville, Inc. 401
Logan-Long Co. 133
National Sheet Metal Roofing Co. 711
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—BLENDED SHINGLES
Amalgamated Roofing Co. 669
American Insulation Co. 427-428-429
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Samuel Cabot, Inc. 491
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Ford Roofing Products Co. 712
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Weatherbest Stained Shingle Co. Inc. 130-131

ROOFING—BUILT-UP
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Philip Carey Co. 128-129
Beckman-Dawson Roofing Co. 132
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Ford Roofing Products Co. 712
Johns-Manville, Inc. 401
Klauer Mfg. Co. 717
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—CANVAS
Wm. L. Barrell Co. 715
Beaver Products Co., Inc. 494-495
John Boyle & Co., Inc. 682
B. F. Nelson Mfg. Co. 406

ROOFING—CEMENT, CONCRETE, ETC.
Anti-Hydro Waterproofing Co. 681-684
Asbestos Shingle, Slate & Sheathing Co. 127
Beckman-Dawson Roofing Co. 132
Certain-teed Products Co. 515
Chatfield Mfg. Co. 157
Edwards Mfg. Co. 134
Hawthorne Roofing Tile Co. 135
Feder-Schwartz Process Co. 704
B. F. Nelson Mfg. Co. 406
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Solvay Process Co. 71
Toch Brothers 711
Truscon Steel Co. 64-65-66-67-68-69

ROOFING—COMPOSITION
Amalgamated Roofing Co. 669
Beckman-Dawson Roofing Co. 132
Barber Asphalt Co. 482-483
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Solvay Process Co. 71

ROOFING—COPPER SHINGLES
American Insulation Co. 427-428-429
Copper & Brass Research Assn. 478
Cortright Metal Roofing Co. 704
Edwards Mfg. Co. 134
Kawneer Co. 163
Klauer Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762
National Sheet Metal Roofing Co. 711

ROOFING—DRIP EDGE
Klauer Mfg. Co. 717
Miller & Gleason 712
Milwaukee Corrugating Co. 759-760-761-762

ROOFING—MASTER SLAB
Certain-teed Products Corp. 515
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424

ROOFING—MASTIC
Amalgamated Roofing Co. 669
Chatfield Mfg. Co. 157
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Sall Mountain Co. 123-124-125-126

ROOFING—METAL (Corrugated)
American Insulation Co. 427-428-429
American Sheet & Tin Plate Co. 682
Edwards Mfg. Co. 134
Inland Steel Co. 83
International Steel & Iron Co. 640-641
Klauer Mfg. Co. 717
Messenger & Parks Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674
Natl. Sheet Metal Roofing Co. 711
New Jersey Zinc Sales Co., Inc. 420
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69
Wheeling Metal & Mfg. Co. 136
Willis Mfg. Co. 85

ROOFING—METAL (Sheets)
American Sheet & Tin Plate Co. 682
Edwards Mfg. Co. 134
Inland Steel Co. 83
Klauer Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674
New Jersey Zinc Sales Co., Inc. 420
Joseph T. Ryerson & Son, Inc. 522
Wheeling Metal & Mfg. Co. 136

ROOFING—METAL SHINGLES
American Insulation Co. 427-428-429
Cortright Metal Roofing Co. 704
Edwards Mfg. Co. 134
Klauer Mfg. Co. 717
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674
National Sheet Metal Roofing Co. 711
New Jersey Zinc Sales Co., Inc. 420
Wheeling Metal & Mfg. Co. 136

ROOFING—ROLL
Barber Asphalt Co. 482-483
Beaver Prod. Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Edwards Mfg. Co. 134
Farley & Loetscher Mfg. Co. 26-453
Ford Roofing Products Co. 712
Johns-Manville, Inc. 401
Klauer Mfg. Co. 717
Logan-Long Co. 133
Milwaukee Corrugating Co. 759-760-761-762
Moeschl Edwards Corrugating Co. 674
Natl. Sheet Metal Roofing Co. 711
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—RUBBER
Amalgamated Roofing Co. 669
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Beckman-Dawson Roofing Co. 132
Edwards Mfg. Co. 134
Ford Roofing Products Co. 712
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—SLAB SHINGLES
Amalgamated Roofing Co. 669
American Insulation Co. 427-428-429
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Ford Roofing Products Co. 712
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Truscon Steel Co. 64-65-66-67-68-69

ROOFING—SLATE
American Insulation Co. 427-428-429
Knickerbocker Slate Corp. 709
B. F. Nelson Mfg. Co. 406
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Slatington Slate Co. 714
Slatington-Bangor Slate Syndicate, Inc. 712
Vendor Slate Co., Inc. 489
J. W. Williams Slate Co. 686

ROOFING—SLATE SURFACED
Amalgamated Roofing Co. 669
Barber Asphalt Co. 482-483
Beaver Products Co., Inc. 494-495
Beckman-Dawson Roofing Co. 132
Philip Carey Co. 128-129
Certain-teed Products Corp. 515
Chatfield Mfg. Co. 157
Farley & Loetscher Mfg. Co. 26-453
Ford Roofing Products Co. 712
Logan-Long Co. 133
B. F. Nelson Mfg. Co. 406
Richardson Co. 423-424
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126

ROOFING—STAINED SHINGLES
American Insulation Co. 427-428-429
Samuel Cabot, Inc. 491
Certain-teed Products Corp. 515
National Sheet Metal Roofing Co. 711
Red Cedar Lbr. Mfrs. Assn. 24
Ruberoid Co. 486-487
Sall Mountain Co. 123-124-125-126
Weatherbest Stained Shingle Co. Inc. 130-131

ROOFING—THATCHED
B. F. Nelson Mfg. Co.....406
Richardson Co. 422-424
Ruberoid Co. 486-487
Weatherbest Stained Shingle Co. Inc.130-131

ROOFING—TILE (Asbestos)
Asbestos Shingle, Slate & Sheathing Co.127
Wonham, Bates & Goode Trading Corp.413

ROOFING—TILE (Clay)
Hawthorne Roofing Tile Co.....135

ROOFING—TILE (Cement)
L. Hansen Co. 470
Hawthorne Roofing Tile Co.....135
Ruberoid Co. 486-487

ROOFING—TILE (Gypsum)
Certain-teed Products Corp. 515
U. S. Gypsum Co.....171-653

ROOFING—TILE (Metal)
Cortright Metal Roofing Co.....704
Edwards Mfg. Co. 134
Klauer Mfg. Co. 717
Milwaukee Corrugating Co..759-760-761-762
Moeschl Edwards Corrugating Co.....674
Natl. Sheet Metal Roofing Co.....711
Wheeling Metal & Mfg. Co.....136

ROOFING—TIN
American Sheet & Tin Plate Co.....682
Edwards Mfg. Co. 134
Klauer Mfg. Co. 717
Milwaukee Corrugating Co..759-760-761-762
Moeschl Edwards Corrugating Co.....674
Wheeling Metal & Mfg. Co.....136
Willis Mfg. Co. 85

ROOFING—WOOD SHINGLES
Birch Mfrs. 680
Hammond Cedar Co., Ltd.....446
Long-Bell Lbr. Co. 30
Red Cedar Lbr. Mfrs. Assn..... 24
Weatherbest Stained Shingle Co. Inc.130-131

ROOFING—ZINC
Cortright Metal Roofing Co.....704
Edwards Mfg. Co. 134
Klauer Mfg. Co. 717
Milwaukee Corrugating Co..759-760-761-762
National Sheet Metal Roofing Co.....711
New Jersey Zinc Sales Co., Inc.....420

ROOFS—INSULATED
Holorib, Inc. 671

ROOFS—SILO
Philip Carey Co. 128-129
Kalamazoo Tank & Silo Co.....201
Metal Forms Corp. 561

ROPE—AWNING (Cotton)
John Boyle & Co., Inc.....682
Hooven & Allison Co.....673
Samson Cordage Works 708

ROPE—DUMBWAITER
Highwood Dumbwaiter Co. 704
Samson Cordage Works.....708
Sedgwick Machine Works 670

ROPE—MANILA AND SISAL
Hooven & Allison Co.....673

ROPE—WIRE
American Steel & Wire Co.....186
Joseph T. Ryerson & Son, Inc.....522
Wickwire Spencer Steel Co., Inc.....184

ROUTERS
Combination Woodworking Machine Co.587
DeWalt Products Co. 576-577

RULES—BOXWOOD
A. S. Aloe Company.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
Lufkin Rule Co. 610
B. L. Makepeace, Inc.....611
Stanley Works 34-35
Warren-Knight Co. 560

RULES—CALIPER
American Blue Print Paper Co.....621
Keuffel & Esser Co.....604-680
Lufkin Rule Co. 610
Stanley Works 34-35
L. S. Starrett Co.....602
Warren-Knight Co. 560

RULES—EXTENSION
A. S. Aloe Company.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
Lufkin Rule Co. 610
B. L. Makepeace, Inc.....611
Master Rule Mfg. Co., Inc.....614
Stanley Works 34-35
Warren-Knight Co. 560

RULES—INSIDE MEASURE
A. S. Aloe Co.....555-585-607
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
Lufkin Rule Co. 610
B. L. Makepeace, Inc.....611
Master Rule Mfg. Co.....614
Warren-Knight Co. 560

RULES—LUMBERMEN'S
Eugene Dietzgen Co. 600
Lufkin Rule Co. 610
Warren-Knight Co. 560
Woodworkers Tool Works 615

RULES—SLIDE SCALE
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co.....604-680
B. L. Makepeace, Inc.....611
L. S. Starrett Co.....602
Warren-Knight Co. 560

RULES—SPRING JOINT
A. S. Aloe Company.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co. 600
Keuffel & Esser Co.....604-680
Lufkin Rule Co. 610
B. L. Makepeace, Inc.....611
Master Rule Mfg. Co., Inc.....614
Stanley Works 34-35
Warren-Knight Co. 560

RULES—STEEL
A. S. Aloe Co.....555-585-607
Eugene Dietzgen Co. 600
Keuffel & Esser Co. 604-680
Lufkin Rule Co. 610
L. S. Starrett Co.....602
Warren-Knight Co. 560

SAFES—WALL
Murphy Door Bed Co..... 58

SALAMANDERS
Abram Cement Tool Co.....502
Donley Bros. Co. 91
Klauer Mfg. Co. 717
Patent Scaffolding Co. 605
Peerless Mfg. Co. 88-89
Standard Scale & Supply Corp.....559

SANDERS—POWER
Combination Woodworking Machine Co.587
DeWalt Products Co. 576-577
Master Woodworker Mfg. Co...578-579-580
National Sanding Machine Co.....589
J. D. Wallace & Co.....570-571
Woodworkers Tool Works 615

SANDPAPER
American Floor Surfacing Machine Co.475
Combination Woodworking Machine Co.587
Lincoln-Schlueter Mach. Co., Inc.....584
National Sanding Machine Co.....589

SANDPAPERING MACHINES
American Saw Mill Machinery Co..574-575
Combination Woodworking Machine Co.587
Electric Rotary Machine Co.....609
Lincoln-Schlueter Mach. Co., Inc.....584
National Sanding Machine Co.....589
Paxson Company 621
J. D. Wallace & Co.....570-571
Woodworkers Tool Works 615

SASH—ARCHITECTURAL (Steel)
David Lupton's Sons Co..... 76
Joseph T. Ryerson & Son, Inc.....522

SASH—BASEMENT (Steel)
William Bayley Co. 73
Detroit Steel Products Co.....74-75
Donley Bros. Co. 91
General Fireproofing Building Products Co. 181-688-705
International Steel & Iron Co.....640-641
David Lupton's Sons Co..... 76
Moeschl Edwards Corrugating Co.....674
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co. 64-65-66-67-68-69
Youngstown Pressed Steel Co.....636-637

SASH—HOLLOW METAL
International Steel & Iron Co.....640-641
Milwaukee Corrugating Co..759-760-761-762
Moeschl Edwards Corrugating Co.....674
Truscon Steel Company ..64-65-66-67-68-69
Zouri Drawn Metals Co.....8-9

SASH—NICKEL SILVER
Kawneer Co. 163

SASH—STORM
William Bayley Co. 73
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-456
Long-Bell Lumber Co..... 30
Paine Lumber Co., Ltd.....19-20-21-22
Phenix Mfg. Co.....706
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17

SASH OPERATING MACHINERY
Hitchings & Co. 479

SAWMILL MACHINERY
American Saw Mill Machinery Co..574-575
Hutchinson Mfg. Co., Inc.....581
Ireland Machine & Foundry Co., Inc...622
Ralph M. Kennedy 612
Sidney Machine Tool Co.....602
Woodworkers Tool Works 615

SAWRIGS
A. S. Aloe Co.....555-585-607
American Saw Mill Machinery Co..574-575
E. H. & E. Mfg. Co., Inc.....582
Combination Woodworking Machine Co.587
Crescent Machine Co. 568-569
Cresson-Morris Company 008
B. M. Cropp Co.....619
DeWalt Products Co. 576-577
Fuller & Johnson Mfg. Co.....620
Gallmeyer & Livingston Co.....586
Heston & Anderson Co.....598
Ireland Machine & Foundry Co., Inc...622
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Knickerbocker Co. 594
Kornau Machine Co. 612
Master Woodworker Mfg. Co...578-579-597
Michel Electric Hand Saw Co.....583
Paxson Co. 621
Sheldon Mfg. Co., Inc.....622
Sidney Machine Tool Co.....602
Silver Mfg. Co. 610
Standard Scale & Supply Co.....559
Wissler Instrument Co. 610

SAWS—BAND
American Saw Mill Machinery Co...574-575
E. C. Atkins & Co.....544
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
Crescent Machine Co. 568-569
DeWalt Products Co. 576-577
Henry Disston & Sons.....399
Gallmeyer & Livingston Co.....586
Heston & Anderson 598
Huther Bros. Saw Mfg. Co.....580
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Kornau Machine Co. 612
Sidney Machine Tool Co.....602
Silver Mfg. Co. 610
Tannewitz Works 618
J. D. Wallace & Co.....570-571
L. & I. J. White Co.....708
Woodworkers Tool Works 615

SAWS—CIRCULAR
A. S. Aloe Company.....555-585-607
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
W. F. & John Barnes Co.....620
W. B. & J. E. Boice.....622
Crescent Machine Co. 568-569
DeWalt Products Co. 576-577
Henry Disston & Son.....399
Gallmeyer & Livingston Co.....586
Heston & Anderson 598
Huther Bros. Saw Mfg. Co.....580
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Tannewitz Works 618
J. D. Wallace & Co.....570-571
L. & I. J. White Co.....708
Wissler Instrument Co. 610
Woodworkers Tool Works 615

SAWS—DRAG
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
L. & I. J. White Co.....708

SAWS—ELECTRIC
E. C. Atkins & Co.....544
W. F. & John Barnes Co.....620
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
Crescent Machine Co. 568-569
DeeWalt Products Co. 576-577
Electro-Magnetic Tool 560
Gallmeyer & Livingston Co.....586
Heston & Anderson 598
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Michel Electric Hand Saw Co.....583
Paxson Company 621
Sheldon Mfg. Co., Inc.....622
Tannewitz Works 618
J. D. Wallace & Co.....570-571
Wissler Instrument Co.....610
Wodack Electric Tool Corp.....622-708
Woodworkers Tool Works 615

SAWS—GANG
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Ralph M. Kennedy 612
L. & I. J. White Co.....708
Woodworkers Tool Works 615

SAWS—GROOVING
E. C. Atkins & Co.....544
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
DeWalt Products Co. 576-577
Henry Disston & Sons.....399
Huther Bros. Saw Mfg. Co., Inc.....580
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
L. & I. J. White Co.....708
Wodack Electric Tool Corp.....622-708
Woodworkers Tool Works 615

SAWS—HACK
E. C. Atkins & Co.....544
Crane Company 154
Henry Disston & Sons.....399
Joseph T. Ryerson & Son, Inc.....522
L. S. Starrett Co.....602
L. & I. J. White Co.....708

SAWS—HAND
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Michel Electric Hand Saw Co.....583
Stanley Works 34-35
L. & I. J. White Co.....708

SAWS—JIG
A. S. Aloe Company.....555-585-607
E. C. Atkins & Co.....544
W. F. & John Barnes Co.....620
W. B. & J. E. Boice.....622
DeWalt Products Co.....576-577
Electro-Magnetic Tool 560
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Woodworkers Tool Works 615

SAWS—PORTABLE POWER
A. S. Aloe Company.....555-585-607
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
Crescent Machine Co. 568-569
Cresson-Morris Co. 608
B. M. Cropp Co.....619
DeWalt Products Co. 576-577
Gallmeyer & Livingston Co.....586
Heston & Anderson 598
Hutchinson Mfg. Co., Inc.....581
Jaeger Portable Power Corp.....620
Jones Superior Machine Co.....598
Ralph M. Kennedy 612
Kornau Machine Co. 612
Michel Electric Hand Saw Co.....583
Paxson Company 621
Sheldon Mfg. Co., Inc.....622
Silver Mfg. Co.....610
Standard Scale & Supply Corp.....559
Tannewitz Works 618
J. D. Wallace & Co.....570-571
Wissler Instrument Co. 610
Wodack Electric Tool Corp.....622-708

SAWS—SPECIAL
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
DeWalt Products Co. 576-577
Electro-Magnetic Tool 560
Hutchinson Mfg. Co., Inc.....581
Jones Superior Machine Co.....598
Ralph M. Kennedy 612

SAWS—SWING
A. S. Aloe Company.....555-585-607
American Saw Mill Machinery Co..574-575
E. C. Atkins & Co.....544
Crescent Machine Co. 568-569
DeWalt Products Co. 576-577
Gallmeyer & Livingston Co.....586
Heston & Anderson 598
Hutchinson Mfg. Co., Inc.....581
Jones Superior Machine Co.....598
Kornau Machine Co. 612
Silver Mfg. Co. 610
J. D. Wallace & Co.....570-571
Wissler Instrument Co. 610
Woodworkers Tool Works 615

SAWS—UTILITY (Electric)
A. S. Aloe Company.....555-585-607
American Saw Mill Machinery Co.574-575
W. B. & J. E. Boice.....622
Crescent Machine Co. 568-569
DeWalt Products Co. 576-577
Hutchinson Mfg. Co., Inc.....581
Jones Superior Machine Co.....598
Paxson Company 621
Silver Mfg. Co. 610
Tannewitz Works 618
J. D. Wallace & Co.....570-571
Wissler Instrument Co. 610
Woodworkers Tool Works 615

SCAFFOLDS—STEEL
Gabriel Steel Co. 86-87
Newark Ladder & Bracket Mfg. Co....700
Patent Scaffolding Co. 605
Richards-Wilcox Mfg. Co.....10-11
Steel Scaffolding Co. 599

SCALES—DRAFTSMEN'S
A. S. Aloe Company.....555-585-607
American Blue Print Paper Co.....621
Keuffel & Esser Co. 604-680
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co. 560

SCALES—WEIGHING
Fairbanks, Morse & Co.....150
Standard Scale & Supply Corp.....559

SCHOOLS—CORRESPONDENCE
Chicago Technical College 411
International Correspondence Schools...689

SCRAPERS—CABINET
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Sargent & Co. 54-55
Stanley Works 34-35
L. S. Starrett Co.....602
Triple "A" Machine Co.....613

SCRAPERS—DIRT
Cincinnati Iron Fence Co.....691
Lansing Company 548-549
LaPlant Choate Mfg. Co.....696

SCRAPERS—FLOOR
E. C. Atkins & Co.....544
Sargent & Company 54-55
L. S. Starrett Co.....602
Triple "A" Machine Co.....613

SCRAPERS—FOOT
Cincinnati Iron Fence Co.....691
National Mfg. Co. 768
Richards-Wilcox Mfg. Co.....10-11

SCREENS—BANK AND COUNTER
Logan Company 696
Wickwire Spencer Steel Co., Inc.....184

SCREENS—BASE
Phenix Mfg. Co. 706

SCREENS—DOOR AND WINDOW
Chicago Roll Screen Co.....656
Cincinnati Iron Fence Co.....691
Curtis Companies Service Bureau..... 18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co. 23
Kawneer Co. 163
Long-Bell Lbr. Co..... 30
Thos. J. Malia Co.....698
Phenix Mfg. Co. 706
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn..... 17

SCREENS—PORCH
Martin Hauser Mfg. Co.....712

SCREENS—REVOLVING
Wickwire Spencer Steel Co., Inc.....184

SCREENS—ROLLING
Chicago Roll Screen Co.....656

SCREENING—WIRE
Chicago Roll Screen Co.....656
Cincinnati Iron Fence Co.....691
Gilbert & Bennett Mfg. Co.....513
New Jersey Wire Cloth Co.....488
Wickwire Spencer Steel Co., Inc.....184

SCREWDRIVERS
Henry Disston & Sons.....399
North Bros. Mfg. Co.....612
L. S. Starrett Co.....602
James Swan Co. 592

SCREWDRIVERS—ELECTRIC
Electro-Magnetic Tool 560
Everhot Mfg. Co.....621
Joseph T. Ryerson & Son, Inc.....522
Stanley Works 34-35
Wodack Electric Tool Corp.....622-708

SCREWS—HAND
Woodworkers Tool Works 615

SCREWS—MACHINE
Progressive Mfg. Co. 706

SCRIBERS
L. S. Starrett Co.....602

SCRUBBING MACHINES
American Floor Surfacing Machine Co.475
Electric Rotary Machine Co.....609
Lincoln-Schlueter Mach. Co., Inc.....584
Standard Scale & Supply Corp.....559

SCUTTLES—ROOF
Epworth Sheet Metal Works.....710

SEATS—TOILET
Phenolic Products Corp. 710

SETS—CABINET DOOR
Frantz Mfg. Co. 3
Greene, Tweed & Co.....712
McKinney Mfg. Co. 48
National Mfg. Co. 768
Stanley Works 34-35

SETS—CELLAR WINDOW
Caldwell Mfg. Co. 704
Frantz Mfg. Co..... 3
Griffin Mfg. Co.....691
H. B. Ives Co.....692
F. D. Kees Mfg. Co.....694
McKinney Mfg. Co..... 48
National Mfg. Co.....768
Stanley Works 34-35

SETS—NAIL
Chas. Morrill, Inc.....714
Stanley Works 34-35
L. S. Starrett Co.....602
James Swan Co.....592

SETS—SAW
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Foley Saw Tool Co.....545
Ralph M. Kennedy.....612
Otis A. Smith Mfg. Co.....712
Stanley Works 34-35
Whisler Mfg. Co.....712

SETS—SCREEN DOOR
Allith-Prouty Co. 46-47
Frantz Mfg. Co..... 3
McKinney Mfg. Co..... 48
National Brass Co.....678
National Mfg. Co.....768
Sargent & Company.....54-55
Stanley Works 34-35
Wagner Mfg. Co..... 53

SEWAGE DISPOSAL PLANTS
Andrews Heating Co.....715
Chemical Toilet Corp.....481
W. S. Dickey Clay Mfg. Co.....207
Duro Pump & Mfg. Co.....148
Hardin-Lavin Co. 755-756-757-766
Kaustine Company, Inc.....647
Kewanee Private Utilities Co.....711
National Fireproofing Co.....204-205

SHADES—WINDOW
E. I. DuPont de Nemours & Co.....174
E. W. A. Rowles Co.....687

SHAFTING AND HANGERS
Woodworkers Tool Works.....615

SHAPES—STRUCTURAL
Inland Steel Co..... 83

SHAPING MACHINES
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
De Walt Products Co.....576-577
Gallmeyer & Livingston Co.....586
Jones Superior Machine Co.....598
Kornau Machine Co.....612
Woodworkers Tool Works.....615

SHAVES—SPOKE
E. C. Atkins & Co.....544
Stanley Works 34-35
L. & I. J. White Company.....708

SHEATHING—ASBESTOS
Asbestos Shingle, Slate & Sheathing Corp. 127
Wonham, Bates & Goode Trading Corp.413

SHEAVES—BALLBEARING
Garden City Plating & Mfg. Co.....707
Sedgwick Machine Works.....670

SHEAVES—WIRE ROPE
Sedgwick Machine Works.....670

SHEETS—ASBESTOS
Asbestos Shingle, Slate & Sheathing Corp. 127
Johns-Manville, Inc. 401
Wonham, Bates & Goode Trading Corp.413

SHEETS—BOX ANNEALED
American Sheet & Tin Plate Co.....682
Edwards Mfg. Co.....134
Inland Steel Co..... 83
Joseph T. Ryerson & Son, Inc.....522

SHEETS—BRASS
Chase Metal Works.....162
Edwards Mfg. Co.....134
Kawneer Company 163

SHEETS—BRONZE
Edwards Mfg. Co.....134
Kawneer Co.....163

SHEETS—COPPER
Chase Companies, Inc.....162
Edwards Mfg. Co 134
C. G. Hussey & Co..... 77
Kawneer Co. 163
Klauer Mfg. Co.....717
Milwaukee Corrugating Co...759-760-761-762
Zouri Drawn Metals Co.....7-8

SHEETS—COPPER ALLOY
American Sheet & Tin Plate Co.....682
Edwards Mfg. Co.....134
Kawneer Company 163
Joseph T. Ryerson & Son, Inc.....522

SHEETS—GALVANIZED
American Sheet & Tin Plate Co.....682
Edwards Mfg. Co.....134
Heltzel Steel Form & Iron Co.....621
Henry Furnace & Foundry Co.....113
Inland Steel Co..... 83
International Steel & Iron Co.....640-641
Klauer Mfg. Co.....717
Milwaukee Corrugating Co..759-760-761-762
L. J. Mueller Furnace Co.....103-104-105
Northfield Iron Co.....712
Joseph T. Ryerson & Son, Inc.....522
Wheeling Metal & Mfg. Co.....136

SHEETS—IRON AND STEEL
American Sheet & Tin Plate Co.....682
Edwards Mfg. Co.....134
Granite City Steel Works.....687
Heltzel Steel Form & Iron Co.....621
Inland Steel Company..... 83
International Steel & Iron Co.....640-641
Klauer Mfg. Co.....717
Joseph T. Ryerson & Son, Inc.....522

SHEETS—LEADCLAD
Wheeling Metal & Mfg. Co.....136

SHELLS—EXPANSION
Ackerman-Johnson Co. 684

SHELVING—SLATE
Structural Slate Co..... 62

SHELVING—STEEL
Frank S. Bets Co.....177
Heltzel Steel Form & Iron Co.....621
David Lupton's Sons Co..... 76

SHELVING—VITREOUS MARBLE
Marietta Mfg. Co.....409

SHIELDS—EXPANSION
Ackerman-Johnson Co. 684
Richards-Wilcox Mfg. Co.....10-11
Joseph T. Ryerson & Son, Inc.....522

SHIELDS—RADIATOR
American Radiator Co.....106-107-476-477
Bowman Supply & Mfg. Co., Inc.....699
Schleicher, Inc. 500-501
Wickwire Spencer Steel Co., Inc.....184

SHOVELS—GASOLINE
Koehring Co. 563

SHOWCASES
Detroit Show Case Co.....160
David Dupton's Sons Co..... 76

SHUTTERS—FIREPROOF
Cincinnati Iron Fence Co.....691
Cornell Iron Works, Inc.....712
Edwards Mfg. Co.....134
Heltzel Steel Form & Iron Co.....621
International Steel & Iron Co.....640-641
Richards-Wilcox Mfg. Co.....10-11
Willis Mfg. Co..... 85

SHUTTERS—ROLLING (Steel)
Cornell Iron Works, Inc.....712
Edwards Mfg. Co.....134
International Steel & Iron Co.....640-641

SHUTTERS—STEEL
Cincinnati Iron Fence Co.....691
Edwards Mfg. Co.....134
Heltzel Steel Form & Iron Co.....621
International Steel & Iron Co.....640-641

SHUTTERS—WOOD
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17

SHUTTER WORKERS
Mallory Mfg. Co.....706

SIGHTS—LEVEL
Eugene Dietzgen Co.....600
B. L. Makepeace, Inc.....611
Stanley Works.....34-35
L. S. Starrett Co.....602
Warren-Knight Co.....560

SIGNS
Garden City Plating & Mfg. Co.....707
Kawneer Co.....163
Logan Co.....696

SILLS—WINDOW (Vitrified Clay)
W. S. Dickey Clay Mfg. Co.....207

SILO MACHINES
Anchor Concrete Machinery Co.....594
Kalamazoo Tank & Silo Co.....201
Van Guilder System Conc. Bldg., Inc.564-565

SILOS—HOLLOW TILE
W. S. Dickey Clay Mfg. Co.....207
Hoosier Building Tile & Silo Co.....202-203
Kalamazoo Tank & Silo Co.....201
Multiplex Concrete Mach. Co.....592
National Fire Proofing Co.....205

SILOS—WOOD
Hoosier Building Tile & Silo Co.....202-203

SINKS—KITCHEN
Crane Co.....154
D. A. Ebinger Co.....690
Standard Sanitary Mfg. Co.....389
Structural Slate Co.....62

SKYLIGHTS
Edwards Mfg. Co.....134
Epworth Sheet Metal Works.....710
International Steel & Iron Co.....640-641
Klauer Mfg. Co.....717
David Lupton's Sons Co.....76
Messenger & Parks Mfg. Co.....717
Milwaukee Corrugating Co..759-760-761-762
Roberts Sash & Door Co.....751-752-753
Joseph T. Ryerson & Son, Inc.....522
Willis Mfg. Co.....85

SLABS—CONCRETE (Reinforced)
Consolidated Expanded Metal Co's.....645
Youngstown Pressed Steel Co.....636-637

SLABS—GYPSUM
Certain-teed Products Corp.....515
U. S. Gypsum Co.....171-653

SLATE—STRUCTURAL
Knickerbocker Slate Corp.....709
Slatington Slate Co.....714
Slatington-Bangor Slate Syndicate, Inc.712
Structural Slate Co.....62
J. W. Williams Slate Co.....686

SOUND CONTROL
Flex-li-num Insulating Co.....170

SOCKETS—CANDELABRA
Hart & Hegeman Mfg. Co.....448

SOCKETS—STUDDING
Sterling Foundry Co.....95

SOFTENERS—WATER
Crane Co.....154
Duro Pump & Mfg. Co.....148
Fort Wayne Engineering & Mfg. Co...149
Monarch Engineering Co.....152
Refinite Co.....700
Vaile-Kimes Co.....153

SPINDLES—PORCH
Curtis Companies Service Bureau.....18
J. B. Foote Foundry Co.....601
Western Pine Mfrs. Assn.....17

SPRINGS—DOOR
Bommer Spring Hinge Co.....44
Richards-Wilcox Mfg. Co.....10-11
Sargent & Co.....54-55

SQUARES—BEVEL
Henry Disston & Sons.....399
Stanley Works.....34-35
L. S. Starrett Co.....602
Warren-Knight Co.....560

SQUARES—COMBINATION
Lufkin Rule Co.....610
L. S. Starrett Co.....602
Stanley Works.....34-35
Warren-Knight Co.....560

SQUARES—STEEL
American Blue Print Paper Co.....621
Nicholls Mfg. Co.....706
Joseph T. Ryerson & Son, Inc.....522
Sargent & Co.....54-55
Stanley Works.....34-35
L. S. Starrett Co.....602
Warren-Knight Co.....560
Wissler Instrument Co.....610

SQUARES—"T"
A. S. Aloe Co.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co.....600
Keuffel & Esser Co.....604-680
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co.....560

SQUARES—TRY AND MITRE
Henry Disston & Sons.....399
Lufkin Rule Co.....610
Stanley Works.....34-35
L. S. Starrett Co.....602

STAINS—CEMENT
Samuel Cabot, Inc.....491
Truscon Laboratories.....70-71

STAINS—SHINGLE
Samuel Cabot, Inc.....491
Certain-teed Products Corp.....515
Feder-Schwartz Process Co.....704
Hammond Cedar Co., Ltd.....446
Martin-Senour Co.....767
Sherwin-Williams Co.....393
Toch Brothers, Inc.....711
Truscon Laboratories.....70-71
Weatherbest Stained Shingle Co. Inc.130-131

STAINS—WOOD
Samuel Cabot, Inc.....491
Certain-teed Products Corp.....515
Feder-Schwartz Process Co.....704
S. C. Johnson & Son.....386-387
Martin-Senour Co.....767
Sherwin-Williams Co.....393
Toch Brothers, Inc.....711
Truscon Laboratories.....70-71

STAIRS—MOVABLE
Bessler Movable Stairway Co.....208-209
Farley & Loetscher Mfg. Co.....26-453
Roberts Sash & Door Co.....751-752-753

STAIRS—SLIDING
Bessler Movable Stairway Co.....208-209
Farley & Loetscher Mfg. Co.....26-453
Roberts Sash & Door Co.....751-752-753

STAIRS—STEEL
Bessler Movable Stairway Co.....208-209
Logan Co.....696
Morton Mfg. Co.....79
Western Architectural Iron Co.....81

STAIRS—WOOD
Bessler Movable Stairway Co.....208-209
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
E. M. Long & Sons.....31
Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17

STAIRWAYS—METAL
Bessler Movable Stairway Co.....208-209
International Steel & Iron Co.....640-641
Logan Co.....696
Morton Mfg. Co.....79
Western Architectural Iron Co.....81

STAIRWAYS—SLATE
Bessler Movable Stairway Co.....208-209
Knickerbocker Slate Corp.....709
Slatington Slate Co.....714
Structural Slate Co.....62
J. W. Williams Slate Co.....686

STAIRWAYS—WOOD
Bessler Movable Stairway Co.....208-209
Farley & Loetscher Mfg. Co.....26-453
Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753

STALLS—SHOWER
Henry Weis Mfg. Co.....78

STALLS—TOILET
Crane Co.....154
Knickerbocker Slate Corp.....709
Slatington Slate Co.....714
Vitrolite Co.....158
Henry Weis Mfg. Co.....78

STALLS—URINAL
Crane Co.....154
Knickerbocker Slate Corp.....709
Slatington Slate Co.....714
Structural Slate Co.....62
Vitrolite Co.....158

STAMPS—STEEL
R. D. Swisher Mfg. Co.....618
Everhot Mfg. Co.....621
Stanley Works.....34-35

STANCHIONS—CATTLE
Hunt-Helm-Ferris & Co.....39-40-41-42
Kalamazoo Tank & Silo Co.....201
J. E. Porter Corp.....50
Wagner Mfg. Co.....53

STANCHIONS—COLUMN
Donley Bros. Co.....91

STANDS—BOILER
Donley Bros. Co.....91
Hardin-Lavin Co.....755-756-757-766

STEEL—FABRICATED
Consolidated Expanded Metal Co's.....645
General Fireproofing Bldg. Products Co.....181-688-705
Heltzel Steel Form & Iron Co.....621
Manhattan Perforated Metal Co., Inc...713
Morton Mfg. Co.....79
Northfield Iron Co.....712
Truscon Steel Co.....64-65-66-67-68-69
Wickwire Spencer Steel Co., Inc.....184

STEEL—STRUCTURAL
Heltzel Steel Form & Iron Co.....621
Inland Steel Co.....83
International Steel & Iron Co.....640-641
Northfield Iron Co.....712
Joseph T. Ryerson & Son, Inc.....522
Truscon Steel Co.....64-65-66-67-68-69

STIRRUPS—CONTINUOUS
Joseph T. Ryerson & Son, Inc.....522

STOCK—DIMENSION
Long-Bell Lbr. Co.....30

STOCK—FIREDOOR
Richards-Wilcox Mfg. Co.....10-11

STOCK—TANK
Kalamazoo Tank & Silo Co.....201
Klauer Mfg. Co.....717
Long-Bell Lbr. Co.....30
Milwaukee Corrugating Co..759-760-761-762

STOPS—BENCH
Chas. Morrill, Inc.....714
Richards-Wilcox Mfg. Co.....10-11

STOPS—DOOR
Allith-Prouty Co.....46-47
Farley & Loetscher Mfg. Co.....26-453
Frantz Mfg. Co.....3
Greene, Tweed & Co.....712
Griffin Mfg. Co.....691
The H. B. Ives Co.....692
Richards-Wilcox Mfg. Co.....10-11
Sargent & Co.....54-55
Stanley Works.....34-35

STORE—FRONTS
Brasco Mfg. Co.....161
The J. W. Coulson & Co.....159
Detroit Show Case Co.....160
International Steel & Iron Co.....640-641
The Kawneer Co.....163
Milwaukee Corrugating Co..759-760-761-762
Joseph T. Ryerson & Son, Inc.....522
The Vitrolite Co.....158
Zouri Drawn Metals Co.....8-9

STOVES—COOK (Coal)
American Stove Co.....460
The Beckwith Co.....108-109
Buffalo Co-Operative Stove Co.....97
Peerless Mfg. Co.....88-89

STOVES—COOK (Oil)
American Stove Co.....460
The Beckwith Co.....108-109
Perfection Stove Co.....697

STOVES—GAS
A. B. Stove Co.....458-549
American Gas Assn.....457
American Stove Co.....460
The Beckwith Co.....108-109
Buffalo Co-Operative Stove Co.....97
Continental Steel Products Co.....80
Electric Fireplace Mfg. Co.....443
Ohio State Stove & Mfg. Co.....462-463
Peerless Mfg. Co.....88-89
Geo. D. Roper Corp.....465
Stanley Plumbing Supply Co., Inc.....703

STRAIGHT EDGES
American Blue Print Paper Co.....621
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Keuffel & Esser Co.....604-680
New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co.....560
Woodworkers Tool Works.....615

STRAINERS—SEWER PIPE
Bowman Supply & Mfg. Co., Inc.....699
Crane Co.....154
The Donley Bros. Co.....91

STRETCHERS—SCREEN WIRE
E. C. Atkins & Co.....544
Woodworkers Tool Works.....615

STRIPES—AWNING
John Boyle & Co., Inc.....682

STRIPS—DIVIDING (Brass for Terrazzo Floor)
Empire Floor Machine Corp.....616

STUCCO
Bishopric Mfg. Co.....403-404
Certain-teed Products Corp.....515
Flint Rock Stucco Co.....199
Mac Stone Stucco Co., Inc.....694
Franklyn R. Muller, Inc.....196-197
Plastic Magnesia Assn.....198
Rocbond Co.....683
Structural Slate Co.....62
United States Gypsum Co.....171-653
Universal Gypsum Co.....661
The Vicro Corp.....195

STUCCO—WATERPROOFED
American Materials Co.....466-467
Anti-Hydro Waterproofing Co.....681-684
Flint Rock Stucco Co.....199
Mac Stone Stucco Co., Inc.....694
Franklyn R. Muller, Inc.....196-197
Rocbond Co.....683
U. S. Materials Co.....466-467

STUCCO MACHINES
Matter Rule Mfg. Co., Inc.....614
Stevens Pneumatic Machine Co.....606

STUDS—FIREPROOF
Berger Mfg. Co.....185
Consolidated Expanded Metal Co's.....645
The Sykes Metal Lath Co.....187
Truscon Steel Co.....64-65-66-67-68-69
The Youngstown Pressed Steel Co..636-637

SUPPORTERS—SASH
Austral Window Co.....215

SURFACERS
American Saw Mill Machinery Co...574-575
The Crescent Machine Co.....568-569
Electric Rotary Machine Co.....609
Empire Floor Machine Corp.....616
Jones Superior Machine Co.....598
Lincoln-Schlueter Machinery Co., Inc..584
National Sanding Machine Company....589
The Wayvell Chappell & Co.....603
Woodworkers Tool Works.....615

SURFACING MACHINES—DESK AND TABLE
The American Floor Surfacing Machine Co.....475
Combination Woodworking Machine Co.587
Empire Floor Machine Corp.....616
National Sanding Machine Co.....589
The Wayvell Chappell & Co.....603

SWAGES—SAW
E. C. Atkins & Co.....544
Henry Disston & Sons.....399
Ralph M. Kennedy.....612

SWITCHES—DOOR
General Electric Co.....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448
Highwood Dumbwaiter Co.....704

SWITCHES—ELECTRIC (Automatic)
American Radiator Co.....106-107-476-477
The Dayton Pump & Mfg. Co.....683
General Electric Co.....
.....432-433-434-435-436-437-438-439-440-441
Hart & Hegeman Mfg. Co.....448
Highwood Dumbwaiter Co.....704
The Monarch Engineering Co.....152

SWITCHES—RECIPROCATING
Electric Fireplace Mfg. Co.....443
Hart & Hegeman Mfg. Co.....448

TABLES—DRAFTING
A. S. Aloe Co.....555-585-607
American Blue Print Paper Co.....621
Eugene Dietzen Co.....600
Keuffel & Esser Co.....604-680
B. L. Makepeace Inc.....611
Warren-Knight Co.....560

TABLES—DRESSING (Built In)
Curtis Companies Service Bureau.....18
Majestic Steel Cabinet Co.....485
"White" Door Bed Co.....169

TABLES—SAW
A. S. Aloe Co.....555-585-607
American Saw Mill Machinery Co...574-575
W. B. & J. E. Boice.....622
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
DeWalt Products Co.....576-577
Gallmeyer & Livingston Co.....586
Heston & Anderson.....598
Jones Superior Machine Co.....598
Ralph M. Kennedy.....612
Sidney Machine Tool Co.....602
Silver Mfg. Co.....610
Tannewitz Works.....618
J. D. Wallace & Co.....570-571
Woodworkers Tool Works.....615

TABLETS—BRONZE
D. A. Ebinger Co.....690

TACKING MACHINES—SCREEN WIRE
J. B. Crofoot Co.....591
Woodworkers Tool Works.....615

TACKERS—SHADE
J. B. Crofoot Co.....591

TAMPERS—CONCERTE
Abram Cement Tool Co.....562
Anchor Concrete Machinery Co.....594
Concrete Equipment Co.....530-531
J. B. Foote Foundry Co.....601
Ideal Concrete Machinery Co.....532-533
Miles Mfg. Co.....590
A. L. Swett Iron Works.....677

TANKS—CLOSET
Bowman Supply & Mfg. Co.....699
Crane Co.....154
Hardin-Lavin Co.....755-756-757-766
B. Karol & Sons Co.....210-211

TANKS—GRAIN (Vitrified Clay)
W. S. Dickey Clay Mfg. Co.....207

TANKS—PNEUMATIC WATER
Bowman Supply & Mfg. Co.....699
Dayton Pump & Mfg. Co.....683
Duro Pump & Mfg. Co.....148
Hardin-Lavin Co.....755-756-757-766
B. Karol & Sons Co.....210-211
Vaile-Kimes Co.....153

TANKS—SEPTIC
Andrews Heating Co.....115
Bowman Supply & Mfg. Co.....699
Chemical Toilet Corp.....481
Crane Co.....154
Dail Steel Products Co.....698
W. S. Dickey Clay Mfg. Co.....207
Duro Pump & Mfg. Co.....148
Edwards Mfg. Co.....134
Hardin-Lavin Co.....755-756-757-766
Kaustine Company, Inc.....647
Kern Mfg. Co.....694
Stanley Plumbing Supply Co., Inc.....708

TANKS—SLATE
Slatington Slate Co.....714
Structural Slate Co.....62

TANKS—STEEL AND IRON
Bowman Supply & Mfg. Co.....699
Chemical Toilet Corp.....481
Edwards Mfg. Co.....134
Heltzel Steel Form & Iron Co.....621
B. Karol & Sons Co.....210-211
Kaustine Co., Inc.....647
Morton Mfg. Co.....79
J. E. Porter Corp.....50

TANKS—TILE
Associated Tile Mfrs.....449

TANKS—WOOD
Kalamazoo Tank & Silo Co.....201

TAPES—MEASURING
A. S. Aloe Company.....555-587-607
American Blue Print Paper Co.....621
Eugene Dietzgen Co.....600
Keuffel & Esser Co.....604-680
Lufkin Rule Co.....610
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co.....560
David White Company, Inc.....595
Wissler Instrument Co.....610

TENONERS
American Saw Mill Machinery Co...574-575
Combination Woodworking Machine Co.587
Crescent Machine Co.....568-569
DeWalt Products Co.....576-577
J. D. Wallace & Co.....570-571
Woodworkers Tool Works.....615

TERRAZZO RUBBING MACHINERY
American Floor Surfacing Machine Co..475
Empire Floor Machine Co.....616

THERMOSTATS—HOT WATER
American Radiator Co.....106-107-476-477
American Thermostat Co.....705
Crane Co.....154
Hardin-Lavin Co.....755-756-757-766

THERMOSTATS—REFRIGERATOR
American Radiator Co.....106-107-476-477
American Thermostat Co.....705

THIMBLES—CHIMNEY
Donley Bros. Co.....91
Edwards Mfg. Co.....134
Henry Furnace & Foundry Co.....113
F. D. Kees Mfg. Co.....694
Klauer Mfg. Co.....717
Sterling Foundry Co.....95

THIMBLES—FLUE
Donley Bros. Co.....91
Edwards Mfg. Co.....134
Henry Furnace & Foundry Co.....113
F. D. Kees Mfg. Co.....694
Majestic Co.....96
Sterling Foundry Co.....95

THRESHOLDS—METAL
Brasco Mfg. Co.....161
Chamberlain Metal Weather Strip Co., Inc.....138
Cincinnati Iron Fence Co.....691
Colonial Fireplace Co.....90
Donley Bros. Co.....91
Federal Metal Weatherstrip Co.....703
Garden City Plating & Mfg. Co.....707
International Steel & Iron Co.....640-641
Kawneer Co.....163
Logan Co.....696
Morton Mfg. Co.....79
Zouri Drawn Metals Co.....8-9

THRESHOLDS—SLATE
Slatington Slate Co.....714
Structural Slate Co.....62

THRESHOLDS—WOOD
Arkansas Oak Flooring Co.....679
E. L. Bruce Co.....14-15
Farley & Loetscher Mfg. Co.....26-453
Long-Bell Lbr. Co.....30
Roberts Sash & Door Co.....751-752-753

TIES—WALL
Bostwick Steel Lath Co.....642
Consolidated Expanded Metal Co's.....645
Donley Bros. Co.....91
Edwards Mfg. Co.....134
F. D. Kees Mfg. Co.....694
Milwaukee Corrugating Co..759-760-761-762
Sykes Metal Lath Co.....187
Willis Mfg. Co.....85
Youngstown Pressed Steel Co.....636-637

TILE—ASBESTOS
Asbestos Shingle, Slate & Sheathing Co.127
Wonham, Bates & Goode Trading Corp.413

TILE—BUILDING (Clay)
W. S. Dickey Clay Mfg. Co.....207
Hoosier Building Tile & Silo Co....202-203
Interlocking Tile Corp.....206
Kalamazoo Tank & Silo Co.....201
Mortarless Tile Machine Co.....717
National Fireproofing Co.....205

TILE—CERAMIC MOSAIC
Associated Tile Mfrs.....449

TILE—CORK
Armstrong Cork & Insulation Co.....168

TILE—DRAIN (Clay)
W. S. Dickey Clay Mfg. Co.....207
Hoosier Building Tile & Silo Co.....202-203

TILE—FIBRE
Beaver Products Co., Inc.....494-495
Upson Co.....502-503

TILE—FIREPROOF
Paul Bencoe.....493
General Fireproofing Bldg. Pdts. Co.....
.....181-688-705
Interlocking Tile Corp.....206
National Fireproofing Co.....205
U. S. Gypsum Co.....171-653
Universal Gypsum Co.....661
Wonham, Bates & Goode Trading Corp.413

TILE—FLOOR AND WALL
Armstrong Cork & Insulation Co.....168
Associated Tile Mfrs.....449
Paul Bencoe.....493
Colonial Fireplace Co.....90
W. S. Dickey Clay Mfg. Co.....207
Hornet Mantel & Tile Co.....93
Interlocking Tile Corp.....206
Mortarless Tile Machine Co.....717
National Fireproofing Co.....205
U. S. Gypsum Co.....171-653
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W. S. Dickey Clay Mfg. Co.....207
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TILE—SLATE
Knickerbocker Slate Corp.....709
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Gen. Fireproofing Bldg. Products Co.
.....181-688-705

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Anchor Concrete Machinery Co.....594
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Concrete Equipment Co.....530-531
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J. B. Foote Foundry Co.....601
Kwik-Mix Concrete Mixer Co.....556
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W. E. Dunn Mfg. Co.....527-528-529

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S. Cheney & Son.....709
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Empire Level & Mfg. Co.....619
Mayes Bros. Tool Mfg. Co.....611
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Everhot Mfg. Co.....621
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L. Beckman Co.....593
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Geier & Bluhm, Inc.....617
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New York Blue Print Paper Co.....699
L. S. Starrett Co.....602
Warren-Knight Co.....560
David White Company, Inc.....595
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B. Karol & Sons Co.....210-211

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Sterling Foundry Co.....95

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Donley Bros. Co.....91
Hardin-Lavin Co.....755-756-757-766
B. Karol & Sons Co.....210-211

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B. Karol & Sons Co.....210-211
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Eugene Dietzen Co.....600
B. L. Makepeace, Inc.....611
New York Blue Print Paper Co.....699
Warren-Knight Co.....560

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Hartmann-Sanders Co.....28
Long-Bell Lbr. Co.....30
Morton Mfg. Co.....79
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Roberts Sash & Door Co.....751-752-753
Western Pine Mfrs. Assn.....17

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Arkansas Oak Flooring Co.....679
Birch Mfrs.....680
E. L. Bruce Co.....14-15
Curtis Companies Service Bureau.....18
Farley & Loetscher Mfg. Co.....26-453
Gould Mfg. Co.....23
Hartmann-Sanders Co.....28
Long-Bell Lbr. Co.....30
Ornamental Products Co.....714
Roberts Sash & Door Co.....751-752-753

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Milwaukee Corrugating Co..759-760-761-762

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California White & Sugar Pine Mfrs.....27
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Farley & Loetscher Mfg. Co.....26-453
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Western Pine Mfrs. Assn.....17

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E. C. Atkins & Co.....544

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Klauer Mfg. Co.....717
Long-Bell Lbr. Co.....30

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American Blue Print Paper Co.....621
Warren-Knight Co.....560
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Stanley Plumbing Supply Co., Inc.....703
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B. Karol & Sons Co.....210-211
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Sherwin-Williams Co.....393
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Feder-Schwartz Process Co. 704
General Fireproofing Bldg. Prod. Co. 181-688-705
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General Fireproofing Bldg. Prod. Co. 181-688-705
Sherwin-Williams Co. 393
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General Fireproofing Bldg. Products Co. 181-688-705
Henry Hope & Sons 701
International Steel & Iron Co. 640-641
David Lupton's Sons Co. 76
Joseph T. Ryerson & Son, Inc. 522
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WINDOWS—CASEMENT (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau 18
Gould Mfg. Co. 23
Long-Bell Lbr. Co. 30
Paine Lumber Co., Ltd. 19-20-21-22
Roberts Sash & Door Co. 751-752-753
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William Bayley Co. 73
Cincinnati Iron Fence Co. 691
Detroit Steel Products Co. 74-75
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Edwards Mfg. Co. 134
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Homer Furnace Co. 717
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WINDOWS—CELLAR (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau 18
Gould Mfg. Co. 23
Long-Bell Lbr. Co. 30
Paine Lumber Co. 19-20-21-22
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17

WINDOWS—COTTAGE (Steel)
William Bayley Co. 73
Detroit Steel Products Co. 74-75
Edwards Mfg. Co. 134
General Fireproofing Bldg. Products Co. 181-688-705
Henry Hope & Sons 701
David Lupton's Sons Co. 76
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69
Western Architectural Iron Co. 81

WINDOWS—COTTAGE (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau 18
Paine Lumber Co., Ltd. 19-20-21-22
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17
Wheeler Osgood Co. 175-176

WINDOWS—DOUBLE-ACTING
William Bayley Co. 73
Paine Lumber Co., Ltd. 19-20-21-22
Roberts Sash & Door Co. 751-752-753
Truscon Steel Co. 64-65-66-67-68-69

WINDOWS—FACTORY (Steel)
Detroit Steel Products Co. 74-75

WINDOWS—GARAGE (Steel)
William Bayley Co. 73
Detroit Steel Products Co. 74-75
Edwards Mfg. Co. 134
General Fireproofing Bldg. Products Co. 181-688-705
Henry Hope & Sons 701
International Steel & Iron Co. 640-641
David Lupton's Sons Co. 76
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69
Western Architectural Iron Co. 81

WINDOWS—GARAGE (Wood)
California White & Sugar Pine Mfrs. Assn. 27
Curtis Companies Service Bureau 18
Detroit Steel Products Co. 74-75
Farley & Loetscher Mfg. Co. 26-453
Gould Mfg. Co. 23
Long-Bell Lbr. Co. 30
Paine Lumber Co. 19-20-21-22
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17
Wheeler, Osgood Co. 175-176

WINDOWS—HOGHOUSE
California White & Sugar Pine Mfrs. Assn. 27
William Bayley Co. 73
Curtis Companies Service Bureau 18
Farley & Loetscher Mfg. Co. 26-453
Long-Bell Lbr. Co. 30
J. E. Porter Corp. 50
Roberts Sash & Door Co. 751-752-753
Truscon Steel Co. 64-65-66-67-68-69
Willis Mfg. Co. 85

WINDOWS—HOLLOW METAL
Edwards Mfg. Co. 134
International Steel & Iron Co. 640-641
Kawneer Co. 163
Truscon Steel Co. 64-65-66-67-68-69
Willis Mfg. Co. 85
Zouri Drawn Metals Co. 8-9

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Gould Mfg. Co. 23
Kawneer Co. 163
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WINDOWS—REVERSIBLE (Metal)
William Bayley Co. 73
Detroit Steel Products Co. 74-75
International Steel & Iron Co. 640-641
Kawneer Co. 163
David Lupton's Sons Co. 76
Joseph T. Ryerson & Son, Inc. 522
Truscon Steel Co. 64-65-66-67-68-69

WINDOWS—REVERSIBLE (Wood)
Austral Window Co. 215
California White & Sugar Pine Mfrs. Assn. 27
Roberts Sash & Door Co. 751-752-753
Western Pine Mfrs. Assn. 17

WINDOWS—ROOF (Steel)
William Bayley Co. 73
Epworth Sheet Metal Works 710
J. E. Porter Corp. 50
Truscon Steel Co. 64-65-66-67-68-69
Willis Mfg. Co. 85

WINDOWS—ROOF (Wood)
Farley & Loetscher Mfg. Co. 26-453
Long-Bell Lbr. Co. 30
Roberts Sash & Door Co. 751-752-753

WINDOWS—WALL (Steel)
William Bayley Co. 73
Truscon Steel Co. 64-65-66-67-68-69

WINDOWS—WALL (Wood)
Farley & Loetscher Mfg. Co. 26-453
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California White & Sugar Pine Mfrs. Assn. 27
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Western Pine Mfrs. Assn. 17

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Tannewitz Works 618
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American Saw Mill Machinery Co. 574-575
Combination Woodworking Machine Co. 587
Crescent Machine Co. 568-569
Cresson-Morris Co. 608
De Walt Products Co. 576-577
Gallmeyer & Livingston Co. 586
Hutchinson Mfg. Co., Inc. 581
Jones Superior Machine Co. 598
Parks Ball Bearing Machine Co. 572-573
Sidney Machine Tool Co. 602
Tannewitz Works 618
J. D. Wallace & Co. 570-571
Woodworkers Tool Works 615

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A. S. Aloe Co. 555-585-607
W. F. & John Barnes Co. 620
De Walt Products Co. 576-577
Hutchinson Mfg. Co., Inc. 581
Jones Superior Machine Co. 598
Parks Ball Bearing Machine Co. 572-573
Silver Mfg. Co. 610
Tannewitz Works 618
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A. S. Aloe Co. 555-585-607
American Saw Mill Machinery Co. 574-575
W. B. & J. E. Boice 622
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Combination Woodworking Machine Co. 587
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American Builder's Quick Reference List of Leading Trade Names and Special Brands of Manufacturers of Building Materials, Contractors' Equipment and Machinery, Home Conveniences, Tools, etc., Represented in This Annual Reference Number

See Advertisers Index, Pages 763 and 765, for Advertisements of These Concerns in This Issue

A. A. A. Garage Door Holder, Knowlson-Stevenson Co., Ann Arbor, Mich.
A. A. A. Hack Saws, Clamps, Saws, E. C. Atkins & Company, Inc., Indianapolis.
A. A. A. NON-BREAKABLE Hack Saws, E. C. Atkins & Co., Inc., Indianapolis.
A. B. Gas Ranges, A. B. Stove Co., Battle Creek, Mich.
A. B. C. Weatherstrips, Hoffbauer Co., New York.
ABESTONE Felt Roofing, H. W. Johns-Manville Co., New York.
ABESTONE Sanitary Composition Flooring, Franklyn R. Muller & Co., Waukegan, Ill.
ABRAM Double Action Long Handled Tools, Abram Cement Tool Company, Detroit.
ACCO Sash Chains, American Chain Co., Bridgeport, Conn.
ACKERMAN-Johnson Screw Anchors & Expansion Bolts, Ackerman-Johnson Co., Chicago.
ACME Bathroom Cabinets, Morton Mfg. Co., Chicago.
ACME Clothes Lines, Samson Cordage Works, Boston.
ACME Gypsum Plaster & Blocks, Certain-teed Products Corp., New York.
ACORN Ventilators, Messenger & Parks, Aurora, Ill.
ADAMANT Screen Cloth, New Jersey Wire Cloth Co., Trenton, N. J.
ADAMANTS Wall Finish, United States Gypsum Co., Chicago.
AD-COP Septic Tanks, Walter S. Dickey Clay Mfg. Co., Kansas City, Mo.
ADMIRAL Measuring Tape, Eugene Dietzgen Co., Inc., Chicago.
ADMIRALTY Tubing, Chase Metal Works, Waterbury, Conn.
ADVANCE Concrete Machines, Lansing Co., Lansing, Mich.
ADVANCE Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
ADVANCE Upright and Post Drills, Silver Mfg. Co., Salem, Ohio.
AETNA Sash Cord, Samson Cordage Works, Boston.
AGAR Gas Auxiliary Register, Auer Register Co., Cleveland.
AGATEX Chemical Cement Floor Hardener, The Truscon Laboratories, Detroit.
AIKEN Saw Sets, Sargent & Co., New Haven, Conn.
AIKEN PATTERN Saw Sets, L. A. Sayre Co., Newark, N. J.
AIR-ELECTRIC Stucco Machines, Stevens Pneumatic Machine Co., Chicago.
AIRID Air Valves, American Radiator Co., New York.
AIRINSULATE Insulating Papers, Sound Deadeners. Air Insulate Co., Chicago.
AIR-WAY Casement Window Hardware, Richards-Wilcox Mfg. Co., Aurora, Ill.
AJAX Furnaces, Co-Operative Foundry Co., Rochester.
AJAX Insulating Compounds, Sherwin-Williams Co., Cleveland.
AJAX Roofing Brackets, Ajax Building Bracket Co., Cleveland Heights, O.
AJAX Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
AJAX Spring Hinges, Chicago Spring Hinge Co., Chicago.
ALABASTER Wall Plasters, U. S. Gypsum Co., Chicago.
ALBA Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
ALEXANDRIA Baths, Crane Co., Chicago.
ALFRESCO Cold Water Paints, Reardon Co., St. Louis.
ALLMETAL Weatherstrips, Allmetal Weatherstrip Co., Chicago.
ALL-STEEL Locks and Sash, National Mfg. Co., Sterling, Ill.
ALL-STEEL Portable Garages, Edwards Mfg. Co., Cincinnati.
ALLITH & PROUTY, Door Hangers, Hardware for Sliding Doors, etc. Allith-Prouty Co., Danville, Ill.
ALOE Levels, A. S. Aloe Co., St. Louis.
ALPHA Portland Cement, Alpha Portland Cement Co., Easton, Pa.
ALPHA Brass Pipe, Chase Cos., Inc., Waterbury, Conn.
ALPINA Syphon Revolving Ventilators, Milwaukee Corrugating Co., Milwaukee, Wis.
ALTRURIA Drinking Fountains, Crane Co., Chicago.
ALVA Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
AMBLER Asbestos Building Products, Asbestos Shingle, Slate & Sheathing Company, Ambler, Pa.
AMERICAN Base & Wall Polisher, American Floor Surfacing Machine Co., Toledo.
AMERICAN Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago.
AMERICAN Cuckoo Clocks, Alarm & Hall Clocks, American Cuckoo Clock Co., Philadelphia.
AMERICAN Iron and Steel Plates for Roofing, Coke, Tin Plate, American Sheet & Tin Plate Co., Pittsburgh.
AMERICAN Lawn Fence, American Steel & Wire Co., Chicago.
AMERICAN Metal Tiles, Milwaukee Corrugating Co., Milwaukee.
AMERICAN Radiators, American Radiator Co., New York.
AMERICAN Sash Trimmers, Manco Mfg. Co., Bradley, Ill.
AMERICAN Saw Mill Machinery, American Saw Mill Mach. Co., Hackettstown, N. J.
AMERICAN OLD STYLE Roofing Tin Plates, American Sheet & Tin Plate Co., Pittsburgh.
AMERICAN RAPID GRINDER Tile, Marble & Terrazzo Floor Surfacer, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN UNIVERSAL Wood Floor Sander, American Floor Surfacing Machine Co., Toledo, Ohio.
AMERICAN WIRE FABRIC, American Steel & Wire Co., Chicago.
AMES Augers, Jas. Swan Co., Seymour, Conn.
AMHERST Stoves & Ranges, Furnaces, Heater & Incinerators, Buffalo Co-op. Stove Company, Buffalo.
ANCHOR Automatic Tampers, Strippers, Block, Brick & Concrete Machines, Anchor Concrete Machinery Co., Columbus, Ohio.
ANCHOR Drawing Instruments, Keuffel & Esser Company,, Hoboken, N. J.
ANCHOR Mortar Colors, C. K. Williams & Co., Easton, Pa.
ANDERSEN White Pine Frames, Andersen Lumber Co., Bayport, Minn.
ANDERSON Floor Scraping Machine, Triple "A" Machine Co., Chicago.
ANSBOR Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
ANTHONY Wire Fence (Zinc Insulated), American Steel & Wire Co., Chicago.
ANTI-HYDRO Cement Waterproofing, Anti-Hydro Waterproofing Co., Newark, N. J.
APARTO Lavatory, Crane Co., Chicago.
APEX Galvanized Sheets, Wheeling Metal & Mfg. Co., Wheeling, W. Va.
APEX Saw Sets, Nail Pullers, etc., Chas. Morrill, Inc., New York.
APOLLO KEYSTONE Copper, Steel Galvanized Sheets, American Sheet & Tin Plate Co., Pittsburgh.
AQUAPROOF Roll Roofing, Ford Roofing Products Co., Chicago.
ARCO Thermostats, Regulators and Tanks, American Radiator Co., New York.
ARCOLA Heaters, American Radiator Co., New York.
ARISTOCRAT Gas Ranges, A-B Stove Co., Battle Creek, Mich.
ARKONA Baths, Standard Sanitary Mfg. Co., Pittsburgh.
ARMOR Tapes, Keuffel & Esser Co., Hoboken, N. J.
ARMORTOP Concrete Floor Hardener, Anti-Hydro Waterproofing Co., Newark, N. J.
ARMSTRONG Cork Tile Flooring, Armstrong Cork & Insulation Co., Pittsburgh.
ARMSTRONG Linoleum, Armstrong Cork Co., Lancaster, Pa.
ART MODEL Registers, Auer Register Co., Cleveland, Ohio.
ART ROC Coloring & Hardener for Cement, Truscon Laboratories, Detroit.
ASBESTONE Sanitary Composition Flooring, Franklyn R. Mueller, Inc., Waukegan, Ill.
ASEPTICOTE Flat Wall Paint, The Truscon Laboratories, Detroit.
ASFALTSLATE Shingles, Philip Carey Co., Lockland, Cincinnati, Ohio.
ASHLAND Pumps, Jacks and Swings, F. E. Myers & Bro. Co., Ashland, Ohio.
ASYLUM Bath Tubs, Crane Co., Chicago.
ATABOY BAROS Wheelbarrows, Sterling Wheelbarrow Co., Milwaukee.
ATHERMOS Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
ATKINS Saws, E. C. Atkins & Co., Indianapolis.
ATLAS Concrete Mixers. Self-Propelling Loader & Conveyor. Atlas Engineering Co., Milwaukee.
ATLAS Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
ATLAS Portland Cement, Atlas Portland Cement Co., New York.
ATLAS Water Closets, Crane Company, Chicago.
ATLO Water Closets, Crane Co., Chicago.
AUER Steel Registers, Auer Register Co., Cleveland.
AUSTRAL Windows and Sash Sustainers, Austral Window Co., New York.
AUTOMATIC Floor Surfacing Machine, Wayvell Chappell & Co., Waukegan, Ill.
AVOLYN Drinking Fountains, Crane Company, Chicago.

B

B & R Trestle Brackets, B & R Trestle Bracket Co., Springfield, Ill.
BAKER Eave Trough Hangers, W. C. Hopson Co., Grand Rapids, Mich.
BALTIC Sash and Bell Cord, Silver Lake Co., Newtonville, Mass.

BANNER Measuring Tapes, The Lufkin Rule Co., Saginaw, Mich.
BANTAM Concrete Mixers, Ransome Concrete Machinery Co., Dunellen, N. J.
BANTAM JUNIOR Concrete Mixers, Ransome Concrete Machinery Co., Dunellen, N. J.
BARNES Wood & Metal Working Machy., Upright or Vertical Drills, Lathes, etc. W. F. & John Barnes Co., Rockford, Ill.
BARRACKS Lavatories, Crane Co., Chicago.
BAYONNE Roof & Deck Cloth, John Boyle & Co., Inc., New York.
BAYLEY-SPRINGFIELD Steel Sash & Operators., Wm. Bayley Co., Springfield, Ohio.
BEAUTIFUL BIRCH, Birch Mfrs., Oshkosh, Wis.
BEAVER Saws, Henry Disston & Sons, Philadelphia.
BEAVER Woodworking Machinery, Hutchinson Mfg. Co., Norristown, Pa.
BEAVER AMERICAN Gypsum Plaster, Beaver Products Co., Inc., Buffalo.
BECKMANN Convertible Level, L. Beckmann Co., Toledo, O.
BERTHA Slab Zinc, New Jersey Zinc Co., New York.
BERLOY Metal Lath, Metal Lumber, Metal Studs, Base and Corner Beads, Berger Mfg. Co., Canton, O.
BESSLER Disappearing Stairway, Bessler Disappearing Stairway Co., Akron, Ohio.
BEST Window Glass, American Window Glass Co., Pittsburgh.
BESTWALL Plaster Wall Boards, Beaver Products Co., Inc., Buffalo
BEVERLY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
BIG ACE BILL Padlocks, Sargent & Co., New Haven, Conn.
BIG BRUTE Motor Trucks, General Motors Truck Co., Pontiac, Mich.
BIG 4 Door Hangers & Track, National Mfg. Co., Sterling, Ill.
BIG 4 Sawsets, Whisler Mfg. Co., Ottumwa, Ia.
BINKS Portable Spraying Outfit, Binks Spray Equipment Co., Chicago.
BISHOPRIC Stucco & Plaster Base, The Bishopric Mfg. Co., Cincinnati.
BITU-MORTAR Waterproofing, Bitu-Mortar Waterproofing Co., New York.
BLACK JACK Tank Heaters, Hunt, Helm & Ferris Co., Harvard, Ill.
BLACKFORD Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
BLUE HEART Manilla Rope, Hooven & Allison Co., Xenia, Ohio.
BLUEKOTE Shingles, Ford Roofing Products Co., Chicago.
BOICE-CRANE Jointers, Woodsawing, Woodworking Machy., etc., W. B. & J. E. Boice, Toledo.
BOMMER Spring Hinges, Floor Hinges, Door Pivots, Lavatory Stall Hardware, Screen Door Hinges and Door Springs, Bommer Spring Hinge Co., Brooklyn, N. Y.
BONDCRETE Concrete Plaster, U. S. Gypsum Co., Chicago.
BONDEX Waterproofing Cement Paint, Reardon Co., St. Louis.
BOSS Mixing Machy. for Concrete, etc., American Cement Machine Co., Keokuk, Iowa.
BOSTWICK Metal Lath and Reinforcing, Bostwick Steel Lath Co., Niles, Ohio.
BOVEE Furnaces, Bovee Furnace Works, Waterloo, Iowa.
BOYLSTON Lavatories, Crane Co., Chicago.
BRADLEY Drawing Knives, James Swan Co., Seymour, Conn.
BRADLEY-MILLER Door and Window Frames, Bradley-Miller Co., Bay City, Mich.
BRASCO Metal Store Fronts, Brasco Mfg. Co., Chicago.
BRASCO HESTER Store Fronts, Brasco Mfg. Co., Chicago.
BRIXMENT (for Brick & Stone Masonry), Louisville Cement Co., Louisville, Ky.
BRONCHO Concrete Mixers, Lansing Co., Lansing, Mich.
BROOKS Ready Roofing, Johns-Manville, Inc., New York.
BRUCE Oak Flooring, E. L. Bruce Co., Memphis, Tenn.
BRUCETON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
BULL DOG Adjusters, Casement Hardware Co., Chicago.
BULL DOG Concrete Mixers, Raber & Lang Mfg. Co., Kendallville, Ind.
BULL DOG Floor Clips & Wall Anchors, Bull Dog Floor Clip Co., Winterset, Ia.
BULL DOG Lamp Guards, McGill Mfg. Co., Valparaiso, Ind.
BULL DOG Vises, Prentiss Vise Co., New York.
BULLDOZER Power Pumps & Working Heads, F. E. Myers & Bro. Co., Ashland, Ohio.
BULLY BOY Saw Sets, Henry Disston & Sons, Philadelphia.

C

C.-H. Casement Adjusters, Casement Hardware Co., Chicago.
C. H. & E. Hoists, Pumps & Portable Saw Rigs, C. H. & E. Mfg. Co., Inc., Milwaukee.
CABOT Paints, Paper, Wood Preservatives, Shingle Stains, etc., Samuel Cabot, Inc., Boston.
CABRANETTE Porcelain Kitchen Equipment & Medicine Cases, Cabranette Corp., Chicago.
CALEDONIA Casement Control, Vincent Whitney Co., Boston.
CALDWELL Screen Door Checks & Sash Balances, Caldwell Mfg. Co., Rochester, N. Y.
CALIFORNIA Pine, Calif. White & Sugar Pine Mfrs. Asso., Call Bldg., San Francisco.
CANNON BALL Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
CAMPBELL Floor Grinding and Polishing Machines, Campbell Machine Co., Wollaston, Mass.
CAN'TGETOFF Door Hangers, J. E. Porter Corp., Ottawa, Ill.
CAPITAL Barrows, Lansing Co., Lansing, Mich.
CAPITOL BOILERS, U. S. Radiator Corp., Detroit.
CAREYS Cements & Asbestos Roofing, Asbestos Roofing & Coating, Philip Carey Mfg. Co., Lockland, Ohio.
CARLTON Bath Tubs, Crane Co., Chicago.
CARNEY Brick & Tile Mortar Cement, The Carney Co., Mankato, Minn.
CASEHOLD Adjusters, United Specialties Mfg. Co., Ltd., Richmond Hill, N. Y.
CAVICCHI Polishing & Surfacing Machines, Cavicchi Polishing Machy. Co., Neponset, Boston.
CECO Column Forms, Reinforcing Bars, Column Spirals, Expanded Metal Reinforcing, Metal Lath, Weatherstrip, Base & Rail Beads, Ceco Weatherstrip Co., Chicago, Ill.
CELOTEX Insulating Lumber, The Celotex Company, Chicago.
CEMENTICO Wall Finish, U. S. Gypsum Co., Chicago.
CENTURY Air & Hand Pumps, Paint & Whitewash Spraying Machines, The F. E. Myers & Bro. Co., Ashland, Ohio.
CENTURY Electric Motors, Century Electric Co., St. Louis.
CEPECO Chains, Chain Products Co., Cleveland.
CERTAIN-TEED Roofing, Asphalt Shingles, Sheathing Paints, Varnishes, Linoleum & Oil Cloth, Gypsum Plaster & Boards & Plaster of Paris, Certain-Teed Products Corp., New York.
CHABELCO Chains, Chain Belt Co., Milwaukee.
CHALLENGE Coal Screens, Gilbert & Bennett Mfg. Co., Chicago.
CHALLENGE Finished & Gauging Plasters, U. S. Gypsum Co., Chicago.
CHALLENGE Measuring Tapes, Lufkin Rule Co., Saginaw, Mich.
CHAMBERLIN Weather Strips, Chamberlin Metal Weather Strip Co., Detroit.
CHAMPION Door Lock Mortiser, Colgan Machy. & Supply Co., Columbus, Ohio.
CHAMPION Door Springs, Sargent & Co., New Haven, Conn.
CHAMPION Drag Saws, American Saw Mill Machinery Co., Hackettstown, N. J.
CHAMPION Finishing & Gauging Plasters, U. S. Gypsum Co., Chicago.
CHAMPION Pipe & Boiler Covering, Johns-Manville, Inc., New York.
CHAMPION Portable Electric Saws, Woodworkers Tool Works, Chicago.
CHAMPION Sanding & Polishing Mchry., Gallmeyer & Livingston Co., Grand Rapids, Michigan.
CHAMPION Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
CHATFIELD Strip Shingles, Chatfield Mfg. Co., Cincinnati.
CHELSEA Lavatories, Crane Co., Chicago.
CHENEY Hammers, Prentiss Vise Co., New York.
CHEVROLET Automobiles and Trucks, Chevrolet Motor Co., Detroit.
CHICAGO Faucets, Chicago Faucet Co., Chicago.
CHICAGO Spring Butts, Door Springs & Spring Hinges, Chicago Spring Hinge Co., Chicago.
CHICAGO Unions, Crane Co., Chicago.
CHI-VO Flat Finish Varnish, E. I. du Pont de Nemours & Co., Inc., Paint & Varnish Div., Philadelphia, Pa.
CHROMOL Hack Saws, Henry Disston & Sons, Philadelphia.
CHRYSOLINE Paints, Solvay Process Co., New York.
CINDER Concrete Building Units, Cinder Concrete Corp., New York.
CLASSIC Double Sink Faucet, Chicago Faucet Co., Chicago.
CLARK Gas Producer, American Heating & Lighting Co., Morenci, Mich.
CLERMONT Lavatories, Crane Co., Chicago.
CLEVELAND Chains, Chain Products Co., Cleveland.
CLIFTON Lavatories, Crane Co., Chicago.
CLIMAX Barrows, Lansing Co., Lansing, Mich.
CLINTON Electrically Welded Fabric Wire Cloth, Wire Lath, Welded Sheathing, Welded Wire, Wickwire Spencer Steel Co., Inc., New York.
CLINTON Metallic Paint, Mortar Colors and Cement Colors, Clinton Metallic Paint Co., Clinton, N. Y.
CLINTON SILK FIBRE Elastic Roof Cement, Clinton Metallic Paint Co., Clinton, N. Y.
CLINTON SUPER HEAT Fire Brick Cement, Clinton Metallic Paint Co., Clinton, N. Y.
CLOSIN Lavatories, Crane Co., Chicago.
CLOVER LEAF Hay Carriers, The F. E. Myers & Bro. Co., Ashland, Ohio.
CLOZTITE Garage Door Sets, Wagner Mfg. Co., Cedar Falls, Ia.
COG GEAR Well, House, Tank & Cistern Pump, The F. E. Myers & Bro. Co., Ashland, Ohio.
COLCO Store Front Construction, J. W. Coulson & Co., Columbus, Ohio.
COLD WAVE Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
COLON Barrows, Lansing Co., Lansing, Mich.
COLONIAL Asbestos Shingles, Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
COLONIAL Lavatories, Crane Co., Chicago.
COLONIAL Fireplace Mantels, Colonial Fireplace Co., Chicago.
COLONIAL MODEL Register, Auer Register Co., Cleveland.
COLONNA Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
COLOR-TEX Cement Finish, Truscon Laboratories, Detroit.
COLTRIN Concrete Mixers, Knickerbocker Co., Jackson, Mich.
COLUMBIA Baths, Crane Company, Chicago.
COLUMBIAN Hay Tracks, J. E. Porter Corp., Ottawa, Ill.
COMMERCIAL Blue Print Paper, Eugene Dietzgen Co., Inc., Chicago.
COMPACTO Bath Tubs & Water Closets, Crane Co., Chicago.
CONQUEROR Swages, Henry Disston & Sons, Philadelphia.
CONRED Baths, Standard Sanitary Mfg. Co., Pittsburgh.
CON-SER-TEX Canvas Roofing, Wm. L. Barrell Co., Inc., New York.
CONSERVO Wood Preservatives, Samuel Cabot, Inc., Boston.
CONSOLE Mail Boxes, Colonial Hardware Mfrs., Chicago.
COOK'S Bits, Augers & Gimlets, James Swan Co., Seymour, Conn.
COOPER'S Metallic Shingles, National Sheet Metal Roofing Co., Jersey City.
COPPERED METAL, Milwaukee Corrugating Co., Milwaukee.
COPLEY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
COPTAR Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
CORINTH Baths, Crane Co., Chicago.
CORNELL Rolling Doors, Cornell Iron Works, L. I. City, N. Y.
CORNELL Tapes, Keuffel & Esser Co., Hoboken, N. J.
CORNELL-WOOD-BOARD and Tile Board in Place of Lath & Plaster for Ceilings, Walls & Partitions, Cornell Wood Products Co., Chicago.
CORNR-WISE Garage Door Hardware, Richards-Wilcox Mfg. Co., Aurora, Ill.
CORONET Baths, Crane Co., Chicago.
CORPORAL Roofing, Certain-Teed Products Corp., New York.
CORRUGATED KNO-BURN Self-Furring Metal Lath, North Western Expanded Metal Co., Chicago.
CORSYN Water Closets, Crane Co., Chicago.
CORTO Radiators, American Radiator Co., New York.
CORTRIGHT Metal Shingles, Cortright Metal Roofing Co., Philadelphia.
CORWITH Lavatories & Baths, Crane Co., Chicago.
COUGAR Saws, Henry Disston & Sons, Philadelphia.
COVERT Fireplace Dampers, Throat Dampers, H. W. Covert Co., New York.
CO-WA-CO Concrete Waterproofing, Co-Wa-Co., Inc., New York.
CRANE Steam Specialties & Plumbing Supplies, Crane Co., Chicago.
CREOLEUM Dampproofing, Truscon Laboratories, Detroit.
CRESCENT Band Saws & Wood-Working Machy., Crescent Mach. Co., Leetonia, Ohio.

CRESCENT Brick & Sewer Pipe Machines, Concrete Mixers, Moulds, Tampers, Raber & Lang Co., Kendallville, Ind.
CRESCENT Lavatories, Crane Co., Chicago.
CRESCENT Lump Lime, Kelley Island Lime & Transport Co., Cleveland.
CRESCENT Sash Fasteners, H. B. Ives Co., New Haven, Conn.
CRESCENT Woodworking Machinery, Crescent Machine Co., Leetonia, Ohio.
CREST Kalsomine, Reardon Co., St. Louis.
CRETA Drinking Fountains, Crane Company, Chicago.
CRIMPEDGE Eave Troughs, Milwaukee Corrugating Co., Milwaukee.
CROFOOT Screen Tackers & Staples, J. B. Crofoot Co., Chicago.
CROMAR Finished Oak Flooring, Crooks-Dittmar Co., Williamsport, Pa.
CROPP Concrete Mixers, B. M. Cropp Co., Chicago.
CROSBY Wire Rope Clips, Wickwire Spencer Steel Co., Inc., New York.
CURTIS Woodwork, Curtis Cos., Inc., Clinton, Ia.
CYCLONE Shingles, Ford Roofing Products Co., Chicago.
CURTIN Noiseless Tank Fittings, A. F. Curtin Valve Co., Medford, Mass.

D

D. C. Mail Boxes, American Device Mfg. Co., St. Louis.
D. K. BARTON Planes, Chisels, Gouges, Hatchet, Mack & Co., Rochester.
DANDIE Concrete Mixers, Koehring Co., Milwaukee.
DARTMOUTH Tapes, Keuffel & Esser Co., Hoboken, N. J.
DAYLIGHT Hog House Windows, Milwaukee Corrugating Co., Milwaukee.
DAYTON Water Supply Systems, Dayton Pump & Mfg. Co., Dayton, Ohio.
DEFIANCE Woodworking Machinery, Sidney Machine Tool Co., Sidney, Ohio.
DELCO LIGHT Incand. Lighting Plants & Accessories for Same, Delco Light Co., Dayton, Ohio.
DENTAL Lavatories, Crane Company, Chicago.
DESCO Store Fronts, Detroit Show Case Co., Detroit.
DETROIT FENESTRA Steel Factory Windows, Detroit Steel Products Co., Detroit.
DE VILBISS SYSTEM, Paint & Varnish Sprays, De Vilbiss Mfg. Co., Toledo.
DEVORO Closet, Standard Sanitary Mfg. Co., Pittsburgh.
DE WALT Woodworker, Dewalt Mfg. Co., Leola, Pa.
DEXTER Door Hardware, National Brass Co., Grand Rapids, Mich.
DIAMOND Metal Lath, Truscon Steel Co., Youngstown, Ohio.
DIAMOND Prepared Plaster, U. S. Gypsum Co., Chicago.
DIAMOND Screen Cloth, New Jersey Wire Cloth Co., Trenton, N. J.
DIAMOND A. Expanded Metal Lath, Bostwick Steel Lath Co., Niles, Ohio.
DIAMOND POINT Saws, Henry Disston & Sons, Philadelphia.
DIAMOND WAY Metal Weather Stripping, Diamond Metal Weather Strip Co., Columbus, Ohio.
DICKEY Silos, Flashing Blocks, Septic Tanks, W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
DICKEY VERSAILLES Fire Brick, W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
DIDDIE-BLITZEN Lightning Rods, L. W. Diddie Co., Marshfield, Wis.
DIETZGEN Levels and Architects' Instruments, Eugene Dietzgen Co., Chicago.
DIME Screen Door Check, Caldwell Mfg. Co., Rochester.
DISSTON Crucible Steel Saws, Files, Rasps, Gummers, Henry Disston & Sons, Inc., Philadelphia.
DOHERTY Self-Closing Cocks & Bibbs, Crane Co., Chicago.
DONLEY Devices and Fireplace Equipment, Donley Bros. Co., Cleveland.
DORIC Baths, Crane Co., Chicago.
DORIS Bath Tubs, Crane Co., Chicago.
DOUBLE DUTY Sockets, General Electric Co., Schenectady, N. Y.
DOUBLE V Door Hangers, J. E. Porter Corp., Ottawa, Ill.
DOUBLE-WHITE Paints, Samuel Cabot, Inc., Boston.
DRENDUL Sand Screens, Gilbert & Bennett Mfg. Co., Chicago.
DUFLEX Door Hangers, Richards-Wilcox Co., Aurora, Ill.
DUL-CAR-TEX Varnish, Truscon Laboratories, Detroit.
DUNTILE Machinery, W. E. Dunn Mfg. Co., Holland, Michigan.
DUPLEX Drawing Papers & Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
DUPLEX Pumps, F. E. Myers & Bro., Ashland, Ohio.
DUPLEX Spray Pumps, The F. E. Myers & Bros. Co., Ashland, Ohio.
DuPONT TONTINE Shade Cloth, Ordinator Co., Inc., New York.
DURO Household Water Supply Systems, Pumps, etc., The Duro Pump & Mfg. Co., Dayton, Ohio.
DUROPLATE Blackboards, E. W. A. Rowles, Chicago.
DURUS Drinking Fountains, Crane Co., Chicago.
DWARF Tapes, Keuffel & Esser Co., Hoboken, N. J.

E

E. Z. Garage Fixtures, Frantz Mfg. Co., Sterling Ill.
EAGLE Sash Pulley, Grand Rapids Hardware Co., Grand Rapids, Mich.
EAST LAKE Metallic Shingles, Crane Co., Chicago.
EASTERN Garden Wheelbarrows, Lansing Co., Lansing, Mich.
EASY-CHANGE Storm and Screen Doors, Combination Door Co., Fond du Lac, Wis.
EASY SET Bath Room Fixtures, J. H. Balmer Co., Newark, N. J.
EATON Lavatories, Crane Company, Chicago.
EBONY Screen Cloth, New Jersey Wire Cloth Co., Trenton, N. J.
EBUR Drinking Fountains & Lavatories, Crane Co., Chicago.
ECCENTRIC Swages, Henry Disston & Sons, Philadelphia.
ECLIPSE Dumbwaiter Checks, Door Springs & Door Checks, Sargent & Co., New Haven, Conn.
ECLIPSE Gas Stoves, Ranges & Heaters, Geo. D. Roper Corp., Rockford, Ill.
ECONO Expanded Metal for Concrete Reinforcement & Machine Guards, North Western Expanded Metal Co., Chicago.
ECONOMY Boilers & Furnaces, International Heater Co., Utica, N. Y.
ECONOMY Conduit, National Metal Molding Co., Pittsburgh.
ECONOMY Metal Weatherstrip, Sager Metal Weatherstrip Co., Chicago.
ECONOMY MODEL Register, Auer Register Co., Cleveland.
EDDYSTONE Sash Cord, Silver Lake Co., Newtonville, Mass.
EDDY-SINK Kitchen Sinks, D. A. Ebinger Mfg. Co., Columbus, O.
EDELWEISS White Enamel (Exterior), Truscon Laboratories, Detroit.
EDGELY Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
EDINBURGH Colors for Mortar, Toch Bros., Inc., New York.
EDMANCO Metal Ceilings, Shingles, Rolling Doors, Shutters, etc., Edwards Mfg. Company, Cincinnati.
EDWARDS Ceilings & Shingles, Edwards Mfg. Co., Cincinnati.
EDWARDS Portable Garages, Ceilings, Shingles, Roofing Tiles, Rolling Doors, Shutters, etc., Edwards Mfg. Co., Cincinnati.
EG-SHELL Mill White, Sherwin-Williams Co., Cleveland.
EJECTO Closet, Standard Sanitary Mfg. Co., Pittsburgh.
ELASTIC Glazing Composition, H. B. Fred Kuhls, Brooklyn, N. Y.
ELASTICA Stucco, U. S. Materials Co., Chicago.
ELASTITE Expansion Joints, Philip Carey Co., Lockland, Ohio.
ELDORADO Wall Plaster, U. S. Gypsum Co., Chicago.
ELECTROBESTOS Insulating Material, Johns-Manville, Inc., New York.
ELECTROMATIC Garage Door Operators, Allith-Prouty Co., Danville, Ill.
ELEGIA Lavatories, Crane Co., Chicago.
EMPIRE Door Stops, Locks, Sash, Caldwell Mfg. Co., Rochester.
EMPIRE Levels, Empire Level Mfg. Co., Milwaukee.
EMPRESS Baths, Crane Company, Chicago.
ENGLISH THATCH Asbestos Shingles, Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.
ERIE Chaplets, S. Cheney & Son, Manlius, N. Y.
ESSEX Baths, Standard Sanitary Mfg. Co., Pittsburgh.
ESSEX Plaster Mixer, Peerless Machinery Co., Cedar Falls, Ia.
EUREKA Barrows, Lansing Company, Lansing, Mich.
EUREKA Corkboard Insulation, Armstrong Cork & Insulation Co., Pittsburgh.
EUREKA Expanded Metal Lath, North Western Expanded Metal Co., Chicago.
EUREKA Joint Cement, Jos. T. Ryerson & Son, Chicago.
EVENDRAFT Chimney Caps, Milwaukee Corrugating Co., Milwaukee.
EVERETT Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
EVER-HOT Water Heaters, Ever Hot Heater Co., Detroit.
EVERHOT Soldering Iron, Branding Iron & Blow Torch, Everhot Mfg. Co., Maywood, Ill.
EVERITE Blue Print Paper, New York Blue Print Paper Co., New York.
EVERLASBESTOS Sanitary Composition Flooring, Everlasbestos Flooring Co., Rochester.
EVERLITE KOATING Wall Paint, Toch Bros., Inc., New York.
EVERLOCK Casement Sash Adjuster, Willis E. Putnam Co., Worcester, Mass.
EVERTITE Roll Roofing, Ford Roofing Products Co., Chicago.
EXCELSIOR Band Chains, Drawing Instruments, Pocket Tapes, Tracing Cloth, Keuffel & Esser Co., Hoboken, N. J.
EXCELSIOR Saw Tools, E. C. Atkins & Co., Inc., Indianapolis.
EXPANSION Metal Trim & Corner Bead, Milwaukee Corrugating Co., Milwaukee.
EXPEDIO Water Closets & Slop Sinks, Crane Co., Chicago.
EXPULSO Closets, Standard Sanitary Mfg. Co., Pittsburgh.

F

FAIRBANKS-MORSE Gasoline, Kerosene Engines, Air Compressors, Centrifugal, Circulating, Deep Well, Power, Railroad & Steam Pumps, Dynamos & Motors, Lighting Plants & Water Systems, Fairbanks, Morse & Co., Chicago.
FALCON Saws, Henry Disston & Sons, Philadelphia.
FAMOUS UNIVERSAL Wood Working Machines, Sidney Machine Tool Co., Sidney, Ohio.
FAULTLESS Spray Pumps, Carriers, Hay Fork, Pulleys, Door Hangers & Pumping Jacks, F. E. Myers & Bro. Co., Ashland, Ohio.
FAVORITE Measuring Tapes, Drawing Tables & Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
FEDERAL Blue Printing Machines, Keuffel & Esser Co., Hoboken, N. J.
FEDERAL Weatherstrips, Federal Metal Weatherstrip Co., Chicago.
FENESTRA Window Frames & Sash, Detroit Steel Products Co., Detroit.
FENWICK Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
FERRIS Hay Tracks, Hunt, Helm Ferris & Co., Harvard, Ill.
FIBRE-TILE Wall Boards, Upson Co., Lockport, N. Y.
FIBREEN Waterproof Paper, American Reenforced Paper Co., Attleboro, Mass.
FIBREROCK Asphalt Saturated Asbestos Rag Felt, Philip Carey Mfg. Co., Lockland, Ohio.
FIBREWOVE Insulating Paper, Philip Carey Mfg. Co., Lockland, Ohio.
FIBRO TEX TOPPING Roof Paint, Truscon Laboratories, Detroit.
FIBRO-TEX Roof Cement, The Truscon Laboratories, Detroit.
FIFTH AVE. Closets, Crane Co., Chicago.
FIRE FELT Pipe & Boiler Covering, Johns-Manville, Inc., New York.
FIRMTREAD Steel Floor Plates, Jos. T. Ryerson & Son, Inc., Chicago.
FITSTITE Barn Door Hardware, Richards-Wilcox Mfg. Co., Aurora.
FLAT TONE Flat Wall Finish, Sherwin-Williams Co., Cleveland.
FLAXLINUM Insulation, Flaxlinum Insulating Co., St. Paul.
FLEUR DE LIS Hinges, Griffin Mfg. Co., Erie, Pa.
FLEX-A-TILE Asphalt Roofing & Shingles, Richardson Co., Lockland, Ohio.
FLEX SICCO Ready Mixed Paints, Toch Bros., Inc., New York.
FLEXIBLE DOOR HANGERS, F. E. Myers & Bro. Co., Ashland, Ohio.
FLEXO Barn Door Hangers, Hunt, Helm & Ferris, Harvard, Ill.
FLEXO Moulds, Flexo-Concrete Mould Co., Cedar Rapids, Iowa.
FLEXO-CRETE Stone, Flexo-Concrete Mould Co., Cedar Rapids, Iowa.
FLEXSTONE Asbestos Roofing, Johns-Manville, Inc., New York.
FLEXSTEEL Armored Conduit, National Metal Moulding Co., Pittsburgh.
FLEXWAY Combination Woodworkers, Flexway Corp., Cincinnati.
FLINT Cement Plaster, U. S. Gypsum Co., Chicago.
FLINT Fire Brick, W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
FLINT ROCK Products, Flint Rock Stucco Co., Inc., Dayton, Ohio.
FLINTOX Concrete Floor Hardener, Toch Bros., Inc., New York.
FLORIAN Drinking Fountains, Crane Company, Chicago.
FLUTED-CATCH Sockets and Receptacles, General Electric Co., Schenectady, N. Y.

FLYING DUTCHMAN Wood Carving Machinery, Gallmeyer & Livingston Co., Grand Rapids, Mich.
FOLEY Saw Filer, Foley Saw Tool Co., Minneapolis, Minn.
FORD Automobiles, Trucks and Tractors, Ford Motor Co., Detroit.
FORD Closets, Crane Co., Chicago.
FORMULA QUALITY House Paint, Truscon Laboratories, Detroit.
FORSTNER Auger Bits, The Progressive Mfg. Co., Torrington, Conn.
FORTY-FORTY 21-E Paver, Ransome Concrete Machinery Co., Dunellen, N. J.
FOUNTAIN Spray Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
FRANTZ QUALITY Hardware for Houses, Barns and Garages, Frantz Mfg. Co., Sterling, Ill.
FRIGIDAIRE Iceless Frigerators, Delco-Light Co., Dayton, Ohio.
FREE-O-DUST Floor Surfacer, Electric Rotary Machine Co., Chicago.
FUME-SAF WHITE Enamel, the Truscon Laboratories, Detroit.
FYER-WAL Fire Doors, Richards-Wilcox Mfg. Co., Aurora, Ill.

G

G. F. Expanded Metal, Corner Bead, Steel Lumber, The General Fireproofing Co., Youngstown, Ohio.
G. F. CRYSTALROX Cement Floor Hardener, General Fireproofing Co., Youngstown, Ohio.
G. F. PEDS for Grounding, General Fireproofing Co., Youngstown, Ohio.
G. F. STEEL-TITE Steel Floors, The General Fireproofing Co., Youngstown, Ohio.
G. F. T. Slate Roofing, Slatington Slate Co., Slatington, Pa.
G & B Levels, Geier & Bluhm, Inc., Troy, N. Y.
G & B Poultry Netting & Wire Cloth, Gilbert & Bennett Mfg. Co., Chicago.
G & B JUNIOR Convertible Level, Geier & Bluhm, Inc., Troy, N. Y.
G. T. Builders' Hardware in Brass and Bronze, Greene, Tweed Co., Newark, N. J.
GABRIEL Reinforcement Material, Coal Chutes and Construction Hardware, Gabriel Steel Co., Detroit.
GALVANITE Products, Ford Roofing Products Co., Chicago.
GARCY Garment Hangers, Garden City Plating & Mfg. Co., Chicago.
GEM Tapes, Eugene Dietzgen Co., Inc., Chicago.
GENASCO Protective Products, Barber Asphalt Co., Philadelphia.
GENASCO LATITE Shingles, Barber Asphalt Co., Philadelphia.
GENASCO POSITIVE SEAL Waterproofing Materials, Barber Asphalt Co., Philadelphia.
GENASCO SEALBAC Shingles, Barber Asphalt Co., Philadelphia.
GENASCO STANDARD TRINIDID Built Up Roofs, Barber Asphalt Co., Philadelphia.
GENESEE Wheelbarrows, Lansing Co., Lansing, Mich.
GENFIRE Sheet Metal Lath, The General Fireproofing Co., Youngstown, Ohio.
GENUINE FRANKLIN TUNNEL Roofing Slate, Slatington Slate Co., Slatington, Pa.
GEYSER Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
GIANT Door Hangers, Tracks & Pumps, The F. E. Myers & Bro. Co., Ashland, Ohio.
GIANT Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
GIANT Padlocks & Chains, Smith & Egge Mfg. Co., Bridgeport, Conn.
GIANT Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
GIANT STEEL Adjustable Stanchions, Hunt, Helm & Ferris Co., Harvard, Ill.
GIPSY Bench Vises, Prentiss Vise Co., New York.
GLEN Dumbwaiters, Highwood Dumbwaiter Co., Closter, N. J.
GLIDE Door Hangers and Tracks, Frantz Mfg. Co., Sterling, Ill.
GLOBE Wheelbarrows, Lansing Company, Lansing, Mich.
GMC Motor Trucks, General Motors Truck Co., Pontiac, Mich.
GOLD MEDAL FINISH Hydrated Lime, Woodville Lime Products Co., Toledo, Ohio.
GOLD MEDAL Ladders and Scaffolds, Patent Scaffolding Co., Chicago.
GOLD SEAL Blue Print Paper, New York Blue Print Paper Co., New York.
GOLD STAR Electric Switches, Hart & Hegeman Mfg. Co., Hartford, Conn.
GOOD ROADS Paver, Ransome Concrete Machinery Co., Dunellen, N. J.
GOSSETT Fasteners, Hinges, F. D. Kees Mfg. Co., Beatrice, Neb.
GOULD QUALITY Doors, Sash & Millwork, Gould Mfg. Co., Oshkosh, Wis.
GOULDING Saws, Henry Disston & Sons, Philadelphia.
GRAHAM BROTHERS Truck, Graham Bros., Inc., Detroit.
GRAND Garage Door Holder, Sasgen Derrick Co., Chicago.
GRAND RAPIDS Grinding Machinery, Gallmeyer & Livingston Co., Grand Rapids, Mich.
GRAND RAPIDS Sash Pulleys, Grand Rapids Hardware Co., Grand Rapids, Mich.
GRANI TEX Transparent Coating for Cement Floors, Truscon Laboratories, Detroit.
GRANITE Wall Plaster, U. S. Gypsum Co., Chicago.
GRANITE Water Softener and Purifier, Graver Corp., East Chicago, Ind.
GRAVER TYPE K WATER SOFTENER, Graver Corp., East Chicago, Ind.
GRAVER ZEOLITE Water Softener, Graver Corp., East Chicago, Ind.
GREAT SOUTHERN Saws, Henry Disston & Sons, Philadelphia.
GREEKOTE Roll Roofing (Slate Coated) & Shingles, Ford Roofing Products Co., Chicago.
GREEN SEAL Oxide of Zinc, New Jersey Zinc Co., New York.
GREENLAW AMERICAN Saws, Henry Disston & Sons, Philadelphia.
GRIFFIN Shelf Brackets and Hardware, Griffin Mfg. Co., Erie, Pa.
GUARD Roofing & Oilcloth, Certain-Teed Products Corp., New York.
GUARDIAN Gas Heaters and Incinerators, Guardian Gas Appliance Co., Cleveland.
GULF STREAM Duck & Roofing Canvas, John Boyle & Co., Inc., New York.
GURNEY Refrigerators, Gurney Refrigerator Co., Fond du Lac, Wis.
GUSHER Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
GYP-LAP Fireproof Sheathing, U. S. Gypsum Co., Chicago.
GYPSOLITE Wallboard, Universal Gypsum Co., Chicago.

H

H & A Twines, Ropes, etc., Hooven & Allison Co., Xenia, Ohio.
H & A Woodworking Machinery, Heston & Anderson, Fairfield, Iowa.
H & A ANCHOR Manila Rope, Hooven & Allison Co., Xenia, Ohio.
H & H Electric Switches & Radio Products, Hart & Hegeman Mfg. Co., Hartford, Conn.
HAGSTROM Friction Catches, Hagstrom Mfg. Co., Glen Cove, N. Y.
HAMLET Gauges, E. C. Atkins & Co., Inc., Indianapolis.
HANDY Clamp Vises, Prentiss Vise Co., New York.
HANDY Door Pulls, Hunt, Helm, Ferris & Co., Harvard, Ill.
HANDY Rule Gauges, Caldwell Mfg. Co., Rochester.
HANDY Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
HANDY Trowels, L. A. Sayre Co., Newark, N. J.
HANDY-ANDY Pullers for Contractors, John Waldron Corp., New Brunswick, N. J.
HANDY HAND Vises, Prentiss Vise Co., New York.
HART Electric Refrigerators, W. B. Wilde Co., Peoria, Ill.
HART Electric Switches, Hart & Hageman Mfg. Co., Hartford, Conn.
HART Oil Burners, W. B. Wilde Co., Peoria, Ill.
HART HEAT Oil Burners, W. B. Wilde Co., Peoria, Ill.
HARTER'S Clusters, McGill Mfg. Co., Valparaiso, Ind.
HARTFORD Lavatories, Crane Company, Chicago.
HARTS Clusters, McGill Mfg. Co., Valparaiso, Ind.
HARTZ Flue Welding Machines, Jos. T. Ryerson & Son, Inc., Chicago.
HARVARD Tapes, Keuffel & Esser Co., Hoboken, N. J.
HARVESTER Hay Carriers, Hunt, Helm & Ferris Co., Harvard, Ill.
HAUSER Adjustable Hangers, Martin Hauser Mfg. Co., Toledo, Ohio.
HEACOCK Saw Mill Machinery, American Saw Mill Machry. Co., Hackettstown, N. J.
HELM Built-In Mail Boxes, Helm Co., St. Louis, Mo.
HELTZEL Steel Forms for Concrete, Loading Skips, Concrete Finishing Machines, etc., Heltzel Steel Form & Iron Works, Warren, Ohio.
HEMD-EDGE Eaves Trough, Klauer Mfg. Co., Dubuque, Iowa.
HENNENS Elastic Calking Paste, Weatherproof Calking Co., Minneapolis.
HERCULEAN Dumbwaiters, Highway Dumbwaiter Co., Cloister, N. J.
HERCULES Extension Garment Carriers, Garden City Plating & Mfg. Co., Chicago.
HERCULES Pumps, F. B. Myers & Bro. Co., Ashland, Ohio.
HERMITAGE Lavatories, Crane Co., Chicago.
HERRICK Refrigerators, Herrick Refrigerator Co., Waterloo, Ia.
HERRINGBONE Rigid Metal Lath, General Fireproofing Co., Youngstown, Ohio.
HERWIG Cast Metal Out-door Lighting Fixtures, Herwig Co., Chicago.
HESS Steel Furnaces, Medicine Cabinets, Mirrors, Hess Warming & Ventilating Co., Chicago.
HIBBEN Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
HIGHWOOD Dumbwaiters & Elevator, Highwood Dumbwaiter Co., Cloister, N. J.
HILLSBORO Wall Plaster, U. S. Gypsum Co., Chicago.
HI LO Door Hangers & Track, Frantz Mfg. Co., Sterling, Ill.
HITCHINGS Sash Operating Devices, Hitchings & Co., Elizabeth, N. J.
HOBBS Block Machines, Anchor Concrete Machinery Co., Columbus, Ohio.
HODELL Sash Chains, Chain Products Co., Cleveland.
HOLDFAST Adjusters, Casement Hardware Co., Chicago.
HOLLAND Warm Air Furnaces, Holland Furnace Co., Holland, Mich.
HOLT Pattern Saw Sets, L. A. Sayre Co., Newark, N. J.
HOLTBID Estimating Service, Radford Architectural Co., Chicago.
HOLTON Tapes, Keuffel & Esser Co., Hoboken, N. J.
HOLORIB Insulated Roofs, Holorib, Inc., Cleveland, O.
HOMER Grate Baskets, Pipeless Furnace, Coal Chutes, etc., Homer Furnace Co., Coldwater, Mich.
HOME COMFORT Weatherstrips, E. J. Wirfs Organization, St. Louis.
HOOKFAST Fasteners, Casement Hardware Co., Chicago.
HOOSIER GIANT BRIX and Glazed Building Tile, Hoosier Building Tile & Silo Co., Albany, Ind.
HOPE Casement Windows, Henry Hope & Sons, New York.
HOPSON Metal Ceilings and Sides, W. C. Hopson Co., Grand Rapids, Mich.
HORNET Mantles & Tile, Hornet Mantle & Tile Co., St. Louis.
HORSEHEAD Slab Zinc, New Jersey Zinc Co., New York, N. Y.
HOSPITAL Lavatories & Baths, Standard Sanitary Mfg. Co., Pittsburgh.
HOSPITAL Water Closets, Crane Co., Chicago.
HUMMER Barndoor Hangers, J. E. Porter Corp., Ottawa, Ill.
HUMPHREY Instantaneous Water Heaters, Humphrey Co., Kalamazoo, Mich.
HUTHER Dado Heads & Saws, Huther Bros. Saw Mfg. Co., Rochester.
HYDRATITE Integral Waterproofing, A. C. Horn Co., Pittsburgh.
HYDREX Waterproofing Felt, Hydrex Asphalt Products Corp., New York.
HY POL-RIB Metal Lath, Truscon Steel Co., Youngstown, Ohio.

I

I. H. C. Com'l Autos, International Harvester Co., Chicago.
IDALIA Lavatories, Crane Company Chicago.
IDEAL Boilers, Brackets, Cements, Water Heaters, Valves, Shields, American Radiator Co., New York, N. Y.
IDEAL Concrete Mixers and Concrete Block Machines, Ideal Concrete Machy. Co., Cincinnati.
IDEAL Elevator Door Hangers, Door Closer & Check & Locking Devices, Richards-Wilcox Mfg. Co., Aurora, Ill.
IDEAL Floor Sanders, Boettcher Co., Chicago, Ill.
IDEAL Hoists, Universal Hoist & Mfg. Co., Cedar Falls, Iowa.
IDEAL Roofing Nails, American Steel & Wire Co., Chicago.
IDEAL Saw Swages, E. C. Atkins & Co., Inc., Indianapolis.
IDEAL Steam & Hot Water Heaters, American Radiator Co., New York.
IDEAL ARCOLA Radiator Boiler, American Radiator Co., New York.

Index of Trade Names

IDEAL Steel Windows, Western Architectural Iron Co., Chicago.
ILLINI Water Closets, Crane Co., Chicago.
ILLINOIS Tapes, Keuffel & Esser Co., Hoboken, N. J.
IMPERIAL Cement Plaster & Prepared Finish, U. S. Gypsum Co., Chicago.
IMPERIAL Metal Shingles, Cortright Metal Roofing Co., Philadelphia.
IMPERIAL Pumps & Carriers, F. E. Myers & Bro., Ashland, Ohio.
IMPERIAL Wall Plasters, U. S. Gypsum Co., Chicago.
IMPROVED ASBESTOCEL Pipe Covering Sheets, Johns-Manville, Inc., New York.
IMPROVED SCHLEUTER Floor Surfacer, Lincoln-Schleuter Machy. Co., Chicago.
IN-A-DOR Beds, Murphy Door Bed Co., Chicago.
INADOR Ironing Boards, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
INKOFF Tracing Cloth Ink Remover, Keuffel & Esser Company, Hoboken, N. J.
INLAND Steel and Copper Sheets, Inland Steel Co., Chicago.
INSULEX Mineral Cork, Universal Gypsum Co., Chicago.
INSULITE Sheathing, Plaster Base and Wall Boards, Insulite Co., Minneapolis.
INTERLOCK Conductor Pipe, Milwaukee Corrugating Co., Milwaukee.
INTERLOCKING TILE, Hollow Building Tile, Interlocking Tile Corp., Cleveland.
INTERLOX Master Slide Rules, Master Rule Mfg. Co., New York.
INTERNATIONAL Hot Water Supply Boilers, International Heater Co., Utica.
INTERNATIONAL Motor Trucks, International Harvester Co., Chicago.
INTERNATIONAL Store Front Construction, Zouri Drawn Metals Co., Chicago.
INTERNATIONAL BARONET Furnaces, International Heater Co., Utica.
INTERNATIONAL CARTON Furnaces, International Heater Co., Utica.
INTERNATIONAL DUKE Furnaces, International Heater Co., Utica.
INTERNATIONAL ECONOMY Boilers, Combination Heaters, etc., International Heater Co., Utica.
INTERNATIONAL ECONOMY Furnaces, International Heater Co., Utica.
INTERNATIONAL HEAVY DUTY Heaters, International Heater Co., Utica.
INTERNATIONAL ONE PIPE Heaters, International Heater Co., Utica.
INTERNATIONAL ONE ROOM School Heaters, International Heater Co., Utica.
INTERNATIONAL PRINCESS Furnaces, International Heater Co., Utica.
INTERNATIONAL QUEEN Furnaces, International Heater Co., Utica.
INTERNATIONAL WOOD Furnaces, International Heater Co., Utica.
INVINCIBLE Chisel Tooth Saw, Henry Disston & Sons, Inc., Philadelphia.
INVISIBLE JOINT Steel Ceilings, Milwaukee Corrugating Co., Milwaukee.
INVISIBOWL Built-in Lavatory, Invisibowl Mfg. Corp., Chicago.
IONIC Tracing Paper, Keuffel & Esser Company, Hoboken, N. J.
IRON KING Tank Heaters, Hunt, Helm, Ferris & Co., Harvard, Ill.
ISLAND CITY Registers, Rock Island Register Co., Rock Island, Ill.
ITALIT Asbestos Roofings, Wonham, Bates & Goode, New York.

J

JACKSON Saws, Henry Disston & Sons, Philadelphia.
JAEGER Concrete Mixers, Jaeger Machine Co., Columbus, Ohio.
JAEGER Woodworking Machine, Jaeger Portable Power Co., Detroit.
JERSEY Wire Cloth, Insect Copper Screen Cloth, Wire Netting & Fencing, New Jersey Wire Cloth Co., Trenton, N. J.
JESTER-SACKETT SYSTEM Plaster Boards on Metal Studs, U. S. Gypsum Co., Chicago.
JIFFY Portable Saw Rigs, A. S. Aloe Co., St. Louis, Mo.
JOHNSON'S PERFECTONE Undercoat & Enamel, S. C. Johnson & Son, Racine, Wis.
JOHNSON'S SANI-SPAR Varnish Stain, S. C. Johnson & Son, Racine, Wis.
JOHNSON'S Wood Dye, Floor Finish & Varnish, S. C. Johnson & Son, Racine, Wis.
JOSEPH Barrows, Lansing Co., Lansing, Mich.

K

KAB-RANGE Gas Ranges, Ohio State Stove & Mfg. Co., Columbus, O.
KAHN Trussed Bar, Truscon Steel Co., Youngstown, O.
KALAMAZOO Tanks and Glazed Building Tile, Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
KAUSTINE Sewage Disposal Systems, Septic Tanks, etc., Kaustine Co., Inc., Buffalo.
KAWNEER Nickel Silver Windows, Kawneer Co., Niles, Mich.
KAWNEER Store Fronts, Copper & Bronze Covered Windows, Kawneer Mfg. Co., Niles, Mich.
KECO Measuring Tapes, Keuffel & Esser Co., Hoboken, N. J.
KEES-GOSSETT Screen & Storm Sash Hangers, F. D. Kees Mfg. Co., Beatrice, Neb.
KEMISOL Waterproofing Liquid for Masonry, Morene Products Co., New York.
KENNEY Showers, Kenney-Cutting Products Co., New York.
KENT Lavatories & Sinks, Crane Company, Chicago.
KERNER Incinerators, Kerner Incinerator Co., Milwaukee.
KERNERATOR BUILT IN THE CHIMNEY Incinerators, Kerner Incinerator Co., Milwaukee.
KEWANEE Coal Chutes, Kewanee Mfg. Co., Kewanee, Ill.
KEWANEE Pneumatic Air Tanks, Pumping Machinery & Electric Lighting Plants, Kewanee Water Supply Co., Kewanee, Ill.
KEY Expanded Metal Lath, General Fireproofing Co., Youngstown, O.
KEYLOCK Stucco and Stucco Base, Flint Rock Stucco Co., Dayton, O.
KEYRIDGE Reinforcement, Edwards Mfg. Co., Cincinnati.
KEYSTONE Copper Steel, Black & Galv. Sheets & Roofing Tin, American Sheet & Tin Plate Co., Pittsburgh.
KEYSTONE Files, Rasps, Saws, Henry Disston & Sons, Philadelphia.
KEYSTONE Hair Felt, Johns-Manville, Inc., New York.
KEYSTONE Carts, Lansing Company, Lansing, Mich.
KEYSTONE Red Cedar Siding, Hammond Cedar Co., New Westminster, B. C., Canada.
KEYSTONE Screen Door Sets, McKinney Mfg. Co., Pittsburgh.
KEYSTONE Water Heaters, Crane Co., Chicago.
KIMBALL Elevators and Dumbwaiters, Kimball Bros. Co., Council Bluffs, Iowa.
KING Block Machines, Miles Mfg. Co., Jackson, Mich.
KING Spring Hinges, Allith-Prouty Co., Danville, Ill.
KING'S CHARM Door Hangers & Track, McKinney Mfg. Co., Pittsburgh.
KINGS WINDSOR Wall Plaster, U. S. Gypsum Co., Chicago.
KINGS WOOD FIBRE Wall Plaster, U. S. Gypsum Co., Chicago.
KIRKER BENDER Spiral Fire Escapes, Logan Co., Louisville, Ky.
KITCHEN MAID Cabinets, Wasmuth-Endicott Co., Andrews, Ind.
KLONDYKE Barrows, Lansing Company, Lansing, Mich.
KNICKERBOCKER Baths, Standard Sanitary Mfg. Co., Pittsburgh.
KNICKERBOCKER Carts, Lansing Company, Lansing, Mich.
KNICKERBOCKER Concrete Mixers, Knickerbocker Co., Jackson, Mich.
KNO-BURN Expanded Metal Lath, North Western Expanded Metal Co., Chicago.
KNOXALL Door Hangers, Tank Heaters, Wire Stretchers, Hunt, Helm, Ferris & Co., Harvard, Ill.
KOEHRING Heavy Duty Concrete Mixers & Crane Excavators, Koehring Co., Milwaukee.
KOLL'S Columns, Hartmann-Sanders Co., Chicago.
KOLOR BRITE Enamel, Martin-Senour Co., Chicago.
KOLTAP Fresh Water Appliance for Fresh Water Systems, Vaile-Kimes Co., Dayton, Ohio.
KONKERRIT Paints, Toch Bros., New York.
KORKER Expansive Bolt Hangers, U. S. Expansion Bolt Co., New York.
KORNAU Woodworkers, Kornau Machine Co., Cincinnati.
KOZY KITCH Kitchenettes, Kozy-Kitch Kitchenet Co., La Grange, Ind.
KURTZON Store Fixture Hardware, Garden City Plating & Mfg. Co., Chicago.
K. V. P. Building Paper, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
KWIK-MIX Concrete Mixers, Kwik-Mix Concrete Mixer Co., Port Washington, Wis.

L

L. C. SMITH Typewriters, L. C. Smith & Bros. Typewriter Co., Syracuse.
LA BELLE Refrigerators, Gurney Refrigerator Co., Ltd., Fond du Lac, Wis.
LABRUM Bath Tubs, Crane Co., Chicago.
LADD Hammers, Sargent & Co., New Haven, Conn.
LAMELLA Roofs, Lamella Roof Syndicate, New York.
LAMINEX Wooden Doors, Wheeler-Osgood Co., Tacoma, Wash.
LANSING Mixers, Wheelbarrows and Trucks, Lansing Co., Lansing, Mich.
LASTILE Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
LATTIS-TRUSS Roof, McKeown Bros., Chicago.
LEAD CLAD Roofing Plates, Wheeling Metal & Mfg. Co., Wheeling, W. Va.
LEHIGH Portland Cement, Lehigh Portland Cement Co., Allentown, Pa.
LEHIGH Zinc Oxide, New Jersey Zinc Co., New York.
LEONARD Thermostatic Water Mixing Valves, Leonard-Rooke Co., Providence, R. I.
LEVOLIER Pull Sockets & Conduit Box Switches, Dimming Switches & Elec. Wall Brackets, McGill Mfg. Co., Valparaiso, Ind.
LIGHTHOUSE Lump Lime, Kelley Island Lime & Transport Co., Cleveland.
LILIPUT Tapes, Keuffel & Esser Co., Hoboken, N. J.
LIMACO Ironing Boards and Bathroom Cabinets, Lima Sheet Metal Products Co., Lima, O.
LINCOLN Twin Disc Waxing, Polishing & Scrubbing Machine, Lincoln-Schlueter Machinery Co., Inc., Chicago.
LINOTILE Flooring, Armstrong Cork & Insulation Co., Pittsburgh.
LINOVA Bath Tubs, Crane Co., Chicago.
LINOVUS Bath Tubs, Crane Co., Chicago.
LIQUID KONDERIT Cement Paints for Dampproofing, Toch Bros., Inc., New York.
LITERA Bath Tubs, Crane Company, Chicago.
LITHOTEX Concrete Floor Hardeners, Living-Stone Co., Baltimore, Md.
LITTLE DAISY Power Grindstone Shaft, Whisler Mfg. Co., Ottumwa, Iowa.
LITTLE GIANT Extension Garment Carriers, Garden City Plating & Mfg. Co., Chicago.
LITTLE GIANT Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
LITTLE GIANT Tank Pumps, Geo. D. Roper Corp., Rockford, Ill.
LITTLE WONDER Molds, Raber & Lang Mfg. Co., Kendallville, Ind.
LIVING STONE Concrete Bond, Living-Stone Co., Baltimore.
LOK TOP Shingles, Richardson Co., Lockland, Ohio.
LONE STAR METAL SHINGLE, Edwards Mfg. Co., Cincinnati.
LONG-BELL Lumber, Timber, Sash & Door Products, etc., Long-Bell Lumber Co., Kansas City, Mo.
LONGSPAN Expanded Metal Lath, North Western Expanded Metal Co., Chicago.
LORAIN Oil Burners, Oven Heat Regulators, American Stove Co., St. Louis.
LOTT Wire Stretchers, American Steel & Wire Co., Chicago.
LOW DOWN Tank Pumps, F. E. Myers & Bro. Co., Ashland, O.
LOXO Convertible Levels, B. L. Makepeace, Inc., Boston.
LUCERENE Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
LUFKIN Rules & Tapes, Lufkin Rule Co., Saginaw, Mich.
LUMINITE Cold Water Paint, Reardon Co., St. Louis.

LUPTON Window Sash, Elbows, Conductor Pipe, Skylights, Steel Shelving & Factory Equipment, David Lupton & Sons Co., Philadelphia.
LUSTRITE Roll Roofing, Ford Roofing Products Co., Chicago.
LUXTON Drinking Fountains, Crane Company, Chicago.
LUXURIA Baths, Standard Sanitary Mfg. Co., Pittsburgh.
LYDON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
LYMCO Casement Window Adjuster, The Lyons Mfg. Co., New Haven, Conn.
LYNDEN Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.

M

McCABE Expansion Bolts & Door Hangers, McCabe Hanger Mfg. Co., New York.
McCORMICK-DEERING Engines and Industrial and Farm Tractors, International Harvester Co., Chicago.
McCRAY Refrigerators & Water Coolers, McCray Refrigerator Co., Kendallville, Ind.
McKINNEY Hardware Specialties, etc., Hinges & Butts, Anti-Friction Butts, McKinney Mfg. Co., Pittsburgh.
MADISON Tapes, Keuffel & Esser Co., Hoboken, N. J.
MADURO Erasing Fluid, Keuffel & Esser Co., Hoboken, N. J.
MAGIC Concrete Mixers, A. S. Aloe Co., St. Louis, Mo.
MAGIC Vises, Hinges, Pipe, Prentiss Vise Co., New York.
MAHONING Expanded Metal Lath, Youngstown, Pressed Steel Co., Warren, Ohio.
MAILO Built-in Letter Boxes, Penn-Greg Mfg. Co., St. Paul, Minn.
MAINE Tapes, Keuffel & Esser Co., Hoboken, N. J.
MAJESTIC Chutes, Dumps, Furnaces, Garbage Receivers, Windows, etc., Majestic Co., Huntington, Ind.
MAJESTIC LAVATORIES, Crane Co., Chicago.
MAJESTIC Garbage Burners, Majestic Co., Huntington, Ind.
MAJESTIC Lavatories, Crane Co., Chicago.
MAJESTIC Steel Cabinets, Majestic Steel Cabinet Co., Chicago.
MAJOR Roofing & Shingles, Certain-teed Products Corp., New York.
MALIA Metal Weatherstrips, Thomas J. Malia, Philadelphia.
MALLORY Standard Shutter Workers, Mallory Mfg. Co., Flemington, N. J.
MANCO Asphalt Cement, Philip Carey Mfg. Co., Lockland, Ohio.
MANHATTAN Urinals, Crane Co., Chicago.
MANSHEAD Lump Lime, Kelley Island Lime & Transport Co., Cleveland.
MARCO Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
MARCOSA Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
MARINE Sash Balances, Pullman Mfg. Co., Rochester.
MARINE CEMENT for Damp-proofing Foundations, Toch Bros., Inc., New York.
MARMOR Lavatories, Crane Co., Chicago.
MARNOT Varnish for Floors, Sherwin-Williams Co., Cleveland.
MARVEL Thermostats, American Thermostat Co., Newark, N. J.
MARVEL Terrazzo Grinding Machine, Lincoln-Schlueter Machy. Co., Inc., Chicago.
MASON Safety Tread, Jos. T. Ryerson & Co., Inc., Chicago.
MASTER Keyless Locks, Master Lock Co., Elkhart, Ind.
MASTER Slide & Folding Rules & Stucco Machines, Master Rule Mfg. Co., Inc., New York.
MASTER Woodworking Machinery and Floor Sanders, Master Woodworker Mfg. Co., Detroit.
MATCHER Bits, Henry Disston & Sons, Philadelphia.
MAURETANIA Water Closets, Crane Company, Chicago.
MECCO Fireproof Sheet Metal Building Material, Moeschl-Edwards Corrugating Co., Cincinnati.
MEDIA Drinking Fountain, Crane Company, Chicago.
MEDIO Bath Tubs, Crane Company, Chicago.
MEDUSA Cement, Sandusky Portland Cement Co., Cleveland, O.
MERUS Drinking Fountains, Crane Company, Chicago.
METAFORM Concrete Forms, Metal Forms Corp., Milwaukee.
METAL SLATE Shingles, Cortright Metal Roofing Co., Philadelphia.
METALASTIC Metal Protective Paints, Sherwin-Williams Co., Cleveland, Ohio.
METAL Molding Surface Raceway for Wires, National Metal Molding Co., Pittsburgh.
METALLIC Measuring Tapes, Lufkin Rule Co., Saginaw, Mich.
METEOR Hot Air Furnaces, Thatcher Corp., New York.
METTOWEE Stone Paving, Vendor Slate Co., Easton, Pa.
MFMA Flooring, Maple Flooring Mfrs. Asso., Chicago.
MICA-KOTE Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
MILCOR Cupolas, Metal Corner Beads, Stock Tanks, Hog Troughs & Ventilating Systems, Milwaukee Corrugating Co., Milwaukee.
MILES Cement Block Machines, Concrete Mixing Machines, Miles Mfg. Co., Jackson, Mich.
MILLER DRIP EDGE Edging for Prepared Roofing, Miller & Gleason, Olean, N. Y.
MINIER Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
MINUSA Drawing Instrument, Keuffel & Esser Co., Hoboken, N. J.
MIRACLE Doors, Paine Lumber Co., Oshkosh, Wis.
MODESTO Lavatories, Crane Company, Chicago.
MONARCH Odorless Gas Heaters, Otto E. Hanson & Sons, Perth Amboy, N. J.
MONARCH Measuring Tapes, Eugene Dietzgen Co., Inc., Chicago.
MONARCH Paints, Martin-Senour Co., Chicago.
MONARCH Planer, Matcher & Moulder, American Sawmill Machinery Co., Hackettstown, N. J.
MONARCH Saw Sets, Henry Disston & Sons, Philadelphia.
MONARCH Water Supply Systems, Monarch Engineering Co., Dayton, Ohio.
MONCRIEF House Heating Furnaces, Henry Furnace & Foundry Co., Cleveland.
MONITOR Cutters, L. & I. J. White Co., Buffalo.
MONROE Lavatories, Crane Co., Chicago.
MORRILL Bench Stops, Saw Sets, Chas. Morrill, Inc., New York.
MOSSBACK Cross Cut Saws, E. C. Atkins & Co., Inc., Indianapolis.
MUELLER Faucets, Mueller Co., Decatur, Ill.
MUELLER Furnaces & Boilers, L. J. Mueller Furnace Co., Milwaukee.
MUELLER CONVECTOR Pipeless Heating System, L. J. Mueller Mfg. Co., Milwaukee.
MULLER Composition Floors, Franklyn R. Muller, Inc., Waukegan, Ill.
MULTICHROME Roofs, Richardson Co., Lockland, Ohio.
MULTILET Multiple Sockets, General Electric Co., Schenectady, N. Y.
MULTIPLEX Stripper, Multiplex Concrete Machinery Co., Elmore, Ohio.
MYBINK Drawing Inks, New York Blue Print Paper Co., New York.
MYERS CENTURY Pumps, F. E. Myers & Bro. Co., Ashland, O.
MYERS DUPLEX Painting & Spraying Machines, F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS IMPROVED Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS O. K. Spray Pumps, Pulleys, Door Hangers, Tracks, F. E. Myers & Bro. Company, Ashland, Ohio.
MYERS PERFECT Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
MYERS SURE LOCK Sling Unloaders & Door Hangers, F. E. Myers Bro. Co., Ashland, Ohio.
MYERS UNIVERSAL HAY FORK Pulley, F. E. Myers & Bro. Co., Ashland, Ohio.

N

NATCO Double Shell Tile, National Fire Proofing Co., Pittsburgh.
NATCO SILO, National Fire Proofing Co., Pittsburgh.
NATCO XXX Load Bearing Tile, National Fire Proofing Co., Pittsburgh.
NATIONAL BOOKS, National Sales Book Co., Inc., Long Island City, N. Y.
NATIONAL Door Hangers, Hinges, Tracks & Builders' Hardware, National Mfg. Co., Sterling, Ill.
NATIONAL Electric Floor Surfacer, National Sanding Machine Co., Chicago.
NATIONAL Fences, American Steel & Wire Co., Chicago.
NATWIRE Wire Goods & Bathroom Fixtures, Wickwire Spencer Steel Co., Inc., New York.
NEAPOL Water Closets, Crane Company, Chicago.
NELSONS MASTER SLAB Shingles and Roofing, B. F. Nelson Mfg. Co., Minneapolis.
NETMESH Expanded Diamond Metal Lath, Milwaukee Corrugating Co., Milwaukee.
NESCO Steel Sheets, National Enamelling & Stamping Co., Chicago.
NEW TONE Flat Wall Paint, Martin-Senour Co., Chicago.
NEVADA Baths & Lavatories, Crane Company, Chicago.
NEVER BREAK Corner Beads, Milwaukee Corrugating Co., Milwaukee.
NEW CENTURY Power Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
NEW CRESCENT Wheelbarrows, Lansing Co., Lansing, Mich.
NEW HARVARD Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
NEW IDEAL Stoves, Heaters & Ranges, "A. B." Stove Co., Battle Creek, Mich.
NEW JERSEY Zinc, New Jersey Zinc Co., New York.
NEW WAY Door Hangers & Tracks, F. E. Myers & Bro. Co., Ashland, Ohio.
NEW WAY GIANT Door Hangers & Tracks, F. E. Myers & Bro. Co., Ashland, Ohio.
NEW YORK Tapes, Keuffel & Esser Co., Hoboken, N. J.
NEW YORK CITY MILLS Moulding Plaster, U. S. Gypsum Co., Chicago.
NIAGARA Insulating Materials, Inc., Johns-Manville, Inc., New York.
NOAHS PITCH Roof Repair Cement, Philip Carey Mfg. Co., Lockland, Ohio.
NONPAREIL Corkboard & Cork Insulating Brick, High Pressure Covering, Armstrong Cork & Insulating Co., Pittsburgh.
NONPAREIL Insulating Brick, Armstrong Cork & Insulating Co., Pittsburgh.
NORFOLK Lavatories, Crane Co., Chicago.
NORTHFIELD Concrete Mixers, Northfield Iron Co., Northfield, Minn.
NORTHLAND Refrigerators, Gurney Refrigerator Co., Fond du Lac, Wis.
NO-SLAM Screen Door Checks, Sargent & Co., New Haven, Conn.
NO-STREAK Wall Registers, Rock Island Register Co., Rock Island, Ill.
NOVO Lavatories, Crane Company, Chicago.
NOVENTO Roong & Sheathing, Hydrex Asphalt Products Corp., New York.
NOVO Kerosene & Gasoline Engines, Hoists, Saw Rigs, Pumping Outfits, Compressor Outfits, Novo Engine Company, Lansing, Mich.
NOWELD Chains, Chain Products Co., Cleveland.
NU AIR Ventilators, Milwaukee Corrugating Co., Milwaukee.
NUROID Roofing, Richardson Co., Lockland, Ohio.
NUTMEG Switches, Hart & Hegeman Mfg. Co., Hartford, Conn.

O

O. G. Fir Gutters, E. M. Long & Sons, Cadiz, Ohio.
O. K. Carriers, Door Hangers & Tracks, F. E. Myers & Bro. Co., Ashland, Ohio.
O & S Concrete Mixers, Orr & Sembower, Reading, Pa.
OHIO Tapes, Keuffel & Esser Co., Hoboken, N. J.
OKOLONA Water Closets, Crane Company, Chicago.
OKOLONA JR., Water Closets, Crane Company, Chicago.
OLD RELIABLE Lath Expanded Metal, Bostwick Steel Lath Co., Niles, Ohio.
OLD VIRGINIA WHITE Paints, Samuel Cabot, Inc., Boston.
OLIVER Lavatories & Water Closets, Crane Co., Chicago.
OLYMPIC Baths, Crane Company, Chicago.
OPHIR Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
OPINE Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
ORBIS Fountains, Crane Company, Chicago.
OREGON Saws, Henry Disston & Son, Philadelphia.
ORIENTAL Metal Shingles, Cortright Metal Roofing Co., Philadelphia.
ORIENTAL STUCCO Exterior Plaster, U. S. Gypsum Co., Chicago.
ORIOLE Saws, Henry Disston & Sons, Philadelphia.
OTHELLO Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
OTT'S Pumps, J. E. Porter Co., Ottawa, Ill.
OUT DOOR-O-WALL Registers, Rock Island Register Co., Rock Island, Ill.

Index of Trade Names

OVAFLEX Armored Conduit, National Metal Molding Co., Pittsburgh.
OVATUS Lavatories, Crane Company, Chicago.
OVERHEAD Garage, Factory and Warehouse Doors, Overhead Door Co., Hartford City, Ind.
OVER-WAY Conveying Systems, Richards-Wilcox Co., Aurora, Ill.

P

P-1 Painting Apparatus, Spray Engineering Co., Boston, Mass.
P-2 FOURTEEN Steel Fabric Reinforcement Base Cove, Plaster, Stucco and Porch Base, Metal, Wire & Reinforcing Lath; Wire, National Steel Fabric Co., Pittsburgh.
PACKARD Concrete Mixer Trailer, American Cement Machine Co., Inc., Keokuk, Iowa.
PACKER Gas Ranges, Heating Stoves, Kitchen & Medicine Cabinets, Kitchen Tables, etc., Ohio State Stove & Mfg. Co., Columbus, Ohio.
PANAMA Cement Block Machines, and Concrete Mixers, J. B. Foote Foundry Co., Fredericktown, Ohio.
PANAMA Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
PARACOTE Roofing & Shingles, Chatfield Mfg. Co., Carthage, Ohio.
PARAGON Drawing Paper, Instruments & Scales, Keuffel & Esser Co., Hoboken, N. J.
PARCHMENT Tracing Paper, Keuffel & Esser Co., Hoboken, N. J.
PARK'S Woodworking Machinery, Parks Ball Bearing Machine Co., Cincinnati.
PARKER Corner Bead, Youngstown Pressed Steel Co., Warren, Ohio.
PARKER-KALON Masonry Nails, Parker-Kalon Corp., New York.
PAUL Pumps & Water Systems, Fort Wayne Engineering & Mfg. Co., Fort Wayne, Ind.
PAYZANT Lettering Pens, Keuffel & Esser Co., Hoboken, N. J.
PEARL Wire Cloth for Doors & Windows, Gilbert & Bennett Mfg. Co., Chicago.
PEARSON Cement Coated Nails, American Steel & Wire Co., Chicago.
PEARSON CYCLOSE Spike Puller, Chas. Morrill (Inc.), New York, N. Y.
PECOPROOF Waterproofing, Philip Carey Mfg. Co., Lockland, Ohio.
PEERLESS Carriers, Hay Fork Pulleys, Hunt, Helm, Ferris & Co., Harvard, Ill.
PEERLESS Fireplace Furnishing & Ranges, Peerless Mfg. Co., Louisville, Ky.
PEERLESS Flue Ventilating, Hospital, Window & Wall Radiators, American Radiator Company, New York.
PEERLESS Pipe Grips, Prentiss Vise Co., New York.
PEERLESS Radiators, American Radiator Co., Chicago.
PEERLESS Roofing, Edwards Mfg. Co., Cincinnati.
PEERLESS Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
PELHAM Sash Cord, Silver Lake Co., Newtonville, Mass.
PENBERTHY Cellar Drainers, Penberthy Injector Co., Detroit, Mich.
PEQUOT Padlocks, Sargent & Co., New Haven, Conn.
PENRHYN STONE, J. W. Williams Slate Co., New York.
PERFECT Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
PERFECT PATTERN Door Springs, National Mfg. Co., Sterling, Ill.
PERFECTION Oak Flooring, Arkansas Oak Flooring Co., Pine Bluff, Ark.
PERFECTION Door & Gate Springs, American Steel & Wire Co., Chicago.
PERFECTION Gummers, E. C. Atkins & Co., Indianapolis.
PERFECTION Heaters, Hunt, Helm, Ferris & Co., Harvard, Ill.
PERFECTION Kerosene Water Heaters, Perfection Stove Co., Cleveland, Ohio.
PERFECTION Mortising Machine, Perfection Mortiser Co., Columbus, Ohio.
PERFECTION Sanitary Closet, Chemical Toilet Mfg. Co., Syracuse.
PERFECTION Saw Tables, American Saw Mill Machinery Co., Hackettstown, N. J.
PERKINS Vegetable Glue, Perkins Glue Co., South Bend, Ind.
PERMAROC Blackboard, E. W. A. Rowles, Chicago.
PETZ Store Front Construction, Detroit Show Case Co., Detroit, Mich.
PHENIX Screens, Awnings, Storm Doors & Windows, Phenix Mfg. Co., Milwaukee.
PHILCO Composition Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
PIATT Automatic Water Heaters, Piatt Water Heater Co., Lansing, Mich.
PICCOLO Tapes, Keuffel & Esser Co., Hoboken, N. J.
PIERCON Baths, Standard Sanitary Mfg. Co., Pittsburgh.
PILOT Drawing Instruments, Keuffel & Esser Co., Hoboken, N. J.
PITMAN Power & Spray Pumps, F. E. Myers & Bro. Co., Ashland, Ohio.
PLASTA-SAVER Expanded Metal Lath, North Western Expanded Metal Co., Chicago.
POLYPHASE Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
POLYPHASE DUPLEX Slide Rules, Keuffel & Esser Co., Hoboken, N. J.
POND Continuous Steel Sash & Sash Operators, David Lupton's Sons Co., Philadelphia.
PONDOSA Pine, Western Pine Mfrs. Asso., Portland, Ore.
POPULAR Tapes, Keuffel & Esser Co., Hoboken, N. J.
POR-SEAL Transpartent Dampproofing for Brick, Cement, etc., Truscon Laboratories, Detroit.
PORTER Hangers, Forks, Pulleys, J. E. Porter Co., Ottawa, Ill.
PRECISE Parallel Attachment, New York Blue Print Paper Co., New York.
PREMIER Water Heaters, Crane Co., Chicago.
PREMIER Saws, Henry Disston & Sons, Philadelphia.
PREMO Lavatories, Crane Company, Chicago.
PRENTISS Vises, Prentiss Vise Co., New York.
PRENTRILL Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
PRESTO Sliding Stairs, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
PRESTON Slate Shingles, Keystone Roofing Mfg. Co., York, Pa.
PRINCETON Tapes, Keuffel & Esser Mfg. Co., Hoboken, N. J.
PRIDE OF THE SHOP Woodworker, Parks Ball Bearing Machine Co., Cincinnati.
PRISON Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
PRISON Lavatories, Crane Company, Chicago.
PROGRESS House Boiler, Thatcher Corp., New York.
PROMCO Screws & Nuts, Progressive Mfg. Co., Torrington, Conn.
PROTEX Corner Bead, Youngstown Pressed Steel Co., Warren, Ohio.
PULLMAN Sash Balances, Door Checks & Hardware Specialties, Pullman Mfg. Co., Rochester.
PURDUE Tapes, Keuffel & Esser Co., Hoboken, N. J.
PURIMO Closets, Standard Sanitary Mfg. Co., Pittsburgh.
PURUS Water Closets, Crane Co., Chicago.
PUTTYLESS Window and Sash, Gould Mfg. Co., Oshkosh, Wis.
PYRAMID Wall Plasters, U. S. Gypsum Co., Chicago.
PYRAMID BRAND Structural Slate, Structural Slate Co., Pen Argyl, Pa.
PYRO-TEX Fireproof Paint, Truscon Laboratories, Detroit.
PYROCELL Insulation & Floor Fill, U. S. Gypsum Co., Chicago.
PYROBAR Roof Tile, Partition, etc., U. S. Gypsum Co., Chicago.
PYROFILL Gypsum Poured Roof & Floor System, U. S. Gypsum Co., Chicago.

Q

QUALITY Finishing & Gauging Plasters, U. S. Gypsum Co., Chicago.
QUALITY Hand Tool Grinders, Boetcher Co., Chicago.
QUALITYBILT Millwork, Farley & Loetscher Mfg. Co., Dubuque, Iowa.
QUATURN Cocks & Bibbs, Chicago Faucet Co., Chicago.
QUICK SALES Show Cases, Detroit Show Case Co., Detroit.
QUILT Sheathing, Samuel Cabot, Inc., Boston.

R

R. F. D. Padlocks, Sargent & Co., New Haven, Conn.
R. I. W. Cement Waterproofing, Toch Bros., New York.
RADIANT Blue Print Paper, Eugene Dietzgen & Co., Inc., Chicago.
RANDALL Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
RANSOME STANDARD Building Mixer, High Carbon Concrete Chutes, Ransome Concrete Machinery Co., Dunellen, N. J.
RAPID TRANSIT Parallel Vise, Prentiss Vise Co., New York.
RAPIDAYTON Oil Tanks & Pumps, Dayton Pump & Mfg. Co., Dayton, Ohio.
READING Cut Nails, Reading Iron Co., Reading, Pa.
RECEPTOR for Shower Baths, Standard Sanitary Mfg. Co., Pittsburgh.
READYBUILT Fireplaces, Pioneer Fireplace & Supply Co., Chicago.
RECESS Drinking Fountains, Lavatories & Bath Tubs, Crane Co., Chicago.
RECESS Lavatories, Standard Sanitary Mfg. Co., Pittsburgh.
RECONA Baths, Standard Sanitary Mfg. Co., Pittsburgh.
RECORD Padlocks, Sargent & Co., New Haven, Conn.
RED HOOP GALVANIZED Shingle Nails, American Steel & Wire Co., Chicago.
RED METAL Chains, Smith & Egge Mfg. Co., Bridgeport, Conn.
RED SCHOOL House & Barn Paint, Martin-Senour Co., Chicago.
RED TOP Wall Plaster, U. S. Gypsum Company, Chicago.
REDKOTE Roll Roofing (Slate Coated) & Shingles, Ford Roofing Products Co., Chicago.
REFINITE Water Softeners, Refinite Co., Omaha.
REGAL Roofing, Johns-Manville, Inc., New York.
REICHERT Metal Moulds for Concrete Construction, Metal Forms Corp., Milwaukee.
RELAX Spring Hinges, Chicago Spring Hinge Co., Chicago.
RELIABLE Door Hangers, Rolling Ladders & Overhead Carriers, Allith-Prouty Co., Danville, Ill.
RELIABLE Measuring Tapes, Lufkin Rule Co., Saginaw, Mich.
RELIABLE Scaffold Brackets, Elite Mfg. Co., Ashland, Ohio.
RELIABLE Squares, L. S. Starrett Co., Athol, Mass.
RELIANCE Asphalt Roofing, Sall Mountain Co., Chicago.
RELIANCE Door Springs, Chicago Spring Hinge Co., Chicago.
RELIANCE Measuring Tape, Eugene Dietzgen & Co., Inc., Chicago.
REMMEL MIXRITE Concrete Mixers, Remmel Mfg. Co., Kewaskum, Wis.
RENNSELAER Tapes, Keuffel & Esser Co., Hoboken, N. J.
REVERE Lavatories, Crane Co., Chicago.
REX Bench & Pipe Vises, Prentiss Vise Co., New York.
REX chains, Chain Belt Co., Milwaukee.
REX Concrete Mixers & Pavers, Chain Belt Co., Milwaukee.
REX Shaft Hangers & Couplings, Set Collars, Traveling Water Screens, etc., Chain Belt Co., Milwaukee.
REXPAR Varnishes, Sherwin-Williams Co., Cleveland.
RICHARDSON Roofing and Wall Boards, Richardson Co., Lockland, Ohio.
RIOW Tanks, Graver Corporation, East Chicago, Ind.
ROCBOND Stucco, Rocbond Co., Harrisburg, Pa.
ROCKFORD Sash Pulleys, National Lock Co., Rockford, Ill.
ROCK ISLAND NO STREAK Registers, Rock Island Register Co., Rock Island, Ill.
ROCKLATH Plasterboard, U. S. Gypsum Co., Chicago.
RODDIS Millwork, Roddis Lbr. & Veneer Co., Marshfield, Wis.
ROEBLING Wire Lath, New Jersey Wire Cloth Co., Trenton, N. J.
ROLLAWAY Door Hangers & Track, Frantz Mfg. Co., Sterling.
ROLLOUT Recess Beds, Holmes Disappearing Bed Co., Woodstock, Ill.
ROOF SEAL Roof Paints, Truscon Laboratories, Detroit.
ROOFRITE Metal Shingles, W. C. Hopson Co., Grand Rapids, Mich.
ROPER Gas & Electric Stoves, Ranges & Heaters, Geo. D. Roper Corp., Rockford, Ill.
ROSE Screen Door Checks, Frank Rose Mfg. Co., Hastings, Neb.
ROSELLE Fountains, Crane Company, Chicago.
ROTARY Ball Cocks, A. F. Curtin Valve Co., Medford, Mass.
ROUND OAK Moistair Heating Systems, Stoves, Ranges, etc., Beckwith Co., Dowagiac, Mich.
ROYAL Lavatories, Crane Company, Chicago.
ROYAL Shingle Machines, American Saw Mill Machinery Co., Hackettstown, N. J.
ROYAL Tool Grinders, S. Cheney & Son, Manlius, N. Y.
ROYAL Wire Fences (Zinc Insulated), American Steel & Wire Co., Chicago.
ROYAL Wood Working Machinery, American Saw Mill Machinery Co., Hackettstown, N. J.
RUBBERTEX Roofing, Richardson Co., Lockland, Ohio.
RUBY-COAL Fireplace Grates, Electric Fireplace Mfg. Co., Inc., Chicago, Ill.
RUBEROID Roofing & Shingles, Ruberoid Co., New York.

RUGBY Lavatories, Crane Company, Chicago.
RUNWEL Door Hangers & Track, Frantz Mfg. Co., Cterling, Ill.
R. W. Door Hangers and Track, Richards-Wilcox Co., Aurora, Ill.
RYERSON Saw Machines, Jos. T. Ryerson & Son, Inc., Chicago.
RYERSON-C. M. C. Lathes, Planers, Radial Drills, Boring Machines, Jos. T. Ryerson & Son, Inc., Chicago.
RYERSON-CONRADSON Lathes, Planers, Radial Drills, Milling Machines, Jos. T. Ryerson & Son, Inc., Chicago.
RYERSON GLADER Nail Machines, Jos. T. Ryerson & Son, Inc., Chicago.

S

S. W. P. Prepared Paint, Sherwin-Williams Co., Cleveland.
SACHEM Sash Cord, Samson Cordage Works, Boston.
SACKETT Plaster Board Slabs, etc., U. S. Gypsum Co., Chicago.
SAGLESS Gate Spring, Pivot Hinges, Chicago Spring Hinge Co., Chicago.
SAL-MO Roofing & Asbestos Material & Asphalt Shingles, Sall Mountain Co., Chicago.
SAL-MO-LINK Roofing, Sall Mountain Co., Chicago.
SAMS Wire Stretchers, Hunt, Helm Ferris & Co., Harvard, Ill.
SAMSON Chains, Chain Products Co., Cleveland.
SAMSON Sash Cord, Shade Cord, Masons Lines, Chalk Lines, Solid Braided Rope, Signal Cord, Bell & Register Cord, Samson Cordage Works, Boston.
SAMSON SPOT Sash Cord, Clothes Lines, Trolley Cord, Arc Lamp Cord, Samson Cordage Works, Boston.
SANDER PLANE Hand Sander, American Floor Surfacing Machine Co., Toledo.
SAN-DURO Bakelite Toilet Seats, Phenolic Products Corp., Rockford, Ill.
SANDVIKEN Swedish Steel Band Saws, Woodworkers Tool Works, Chicago.
SANETO Water Closets, Crane Company, Chicago.
SANICOTE Wall Finish, Reardon Co., St. Louis.
SANI-ONYX Vitreous Marble, Marietta Mfg. Co., Indianapolis, Ind.
SANEQUIP Septic Tanks, Chemical Toilet Corp., Syracuse.
SANISON Tapes, Keuffel & Esser Co., Hoboken, N. J.
SANITARIUM Lavatories, Crane Company, Chicago.
SANITARY School Indirect Radiators, American Radiator Co., New York.
SANITAS Wall Covering, Standard Textile Products Co., New York.
SANITEX Sanitary Closet Seat Spring Hinges, Chicago Spring Hinge Co., Chicago.
SANWALL Water Closets, Crane Company, Chicago.
SARGENT Hammers, Sargent Co., New Haven, Conn.
SASGEN Derricks, Sasgen Derrick Co., Chicago.
SAYRE Shingling Hatchets, L. A. Sayre Co., Newark, N. J.
SCAR-NOT Varnish, Sherwin-Williams Co., Cleveland.
SCHLUETER Rapid Floor Surfacers, Lincoln-Schlueter Machy. Co., Inc., Chicago.
SEACTO Water Closets, Crane Company, Chicago.
SEDGWICK Elevators and Dumbwaiters, Sedgwick Machine Works, New York.
SEE-B Waterproof Tracing Cloth, New York Blue Print Paper Co., New York.
SELF-SENTERING Concrete Reinforcing, General Fireproofing Co., Youngstown, Ohio.
SELFLOCK Eavestrough Hangers, Milwaukee Corrugating Co., Milwaukee.
SELLERS Kitchen Cabinets, G. I. Sellers & Sons, Elwood, Ind.
SEMCO Elevators, Sidney Elevator Mfg. Co., Sidney, Ohio.
SEMHI Milling Saws, Huther Bros. Saw Mfg. Co., Rochester.
SERENO Drinking Fountains, Crane Company, Chicago.
SERVICISED Expansion Joint, American Insulating Co., Philadelphia.
SEVILLE Lavatories, Crane Co., Chicago.
SHARON Base Bead, Youngstown Pressed Steel Co., Warren, Ohio.
SHARON Channels, Youngstown Pressed Steel Co., Warren, Ohio.
SHEDPEL Waterproof Fabrics, Wm. L. Barrell Co., Inc., New York.
SHEETROCK Wall Board & Crack Filler, U. S. Gypsum Co., Chicago.
SHELBAS Lavatories, Crane Co., Chicago.
SHELDON CONCRETE Mixer & Portable Saw Rig, Sheldon Mfg. Co., Nehawka, Neb.
SHEELAV Lavatories, Crane Co., Chicago.
SHERADUCT Rigid Conduit, National Metal Molding Co., Pittsburgh.
SHEPARD Bench & Clamp Vises, Prentiss Vise Co., New York.
SHEVLIN Pine, Shevlin, Carpenter & Clarke Co., Minneapolis, Minn.
SIDNEY Elevators and Dumbwaiters, Sidney Elevator Mfg. Co., Sidney, Ohio.
SIDNEY Woodworking Machinery, Sidney Machine Tool Co., Sidney, Ohio.
SILENT Automatic Oil Burners, Silent Automatic Corp., Detroit.
SILENT Door Hangers & Track, National Mfg. Co., Sterling, Ill.
SILICO Wall Finish, U. S. Gypsum Co., Chicago.
SILVER Grinders, Drilling Machines, Saw Tables, Hub Boring Machy., Silver Mfg. Company, Salem, Ohio.
SILVER LAKE Awning, Dumbwaiter, Sash, Shade, Ball, Trolley & Ventilator Cords, Silver Lake Co., Newtonville, Mass.
SILVER STAR Electric Switches, Hart & Hegeman Mfg. Co., Hartford, Conn.
SILVER STEEL Saws, E. C. Atkins & Co., Indianapolis.
SIMPLEX Concrete Mixer, Miles Mfg. Co., Jackson, Mich.
SIMPLEX Door Hangers, Richards-Wilcox Mfg. Co., Aurora, Ill.
SIMPLEX Levels, New York Blue Print Paper Co., New York.
SIMPLEX Pumps, Jacks & Door Hangers, F. E. Myers & Bro. Co., Ashland, Ohio.
SIMPLEX Single & Double Acting Spring Hinges, Chicago Spring Hinge Co., Chicago.
SIMPLICITY Saw Mill Dogs, American Saw Mill Machinery Co., Hackettstown, N. J.
SINGER Block Machines, Miles Mfg. Co., Jackson, Mich.
SINGLE LEVER Friction Hoists, J. E. Porter Corp., Ottawa, Ill.
SINTON Lavatories, Crane Company, Chicago.
SISALKRAFT Waterproof Building Paper, American Reenforced Paper Co., Attleboro, Mass.
SLYPHON Radiator Valves, American Radiator Co., Chicago.
SKILSAW Electric Saw, Michel Electric Hand Saw Co., Chicago.
SMITH Concrete Mixers, T. L. Smith Co., Milwaukee.
SMITH Tilting & Non-Tilting Concrete Mixers, T. L. Smith & Co., Milwaukee.
SNO-WHITE Enamel, Truscon Laboratories, Detroit.
SNOW WHITE Filler, U. S. Gypsum Co., Chicago.
SNOWFLAKE Hydrated Lime, Kelley Island Lime & Transport Co., Cleveland.
SOLARITE Kalsomine, Reardon Co., St. Louis.
SOLVAY Calcium Chloride, Solvay Process Co., New York.
SOUTHERN Barrows, Lansing Co., Lansing, Michigan.
SPARGO Screen Cloth, Spargo Wire Co., Rome, N. Y.
SPEED MARVEL Wood Working Machy., Hutchinson Mfg. Co., Norristown, Pa.
SPEEDWAY Electric Drills, Grinders, etc., Electro Magnetic Tool Co., Chicago.
SPIRO Water Closets, Crane Co., Chicago.
SPRACO Cement Guns, Spraco Painting Equipment Co., Boston.
SPRA-RITE Nozzles, Binks Spray Equipment Co., Chicago.
SQUARE DEAL Fibre Board, Upson Co., Lockport, N. Y.
STANDARD Attaching Plugs & Receptacles, General Electric Co., Schenectady, N. Y.
STANDARD Bath Room Fixtures, Standard Sanitary Mfg. Co., Pittsburgh.
STANDARD Concrete Mixer, Standard Scale & Supply Co., Pittsburgh, Pa.
STANDARD Fire Brick, W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
STANDARD Lump Lime, Kelley Island Lime & Transport Co., Cleveland.
STAR Barn Equipment, Hunt, Helm, Ferris & Co., Harvard, Ill.
STAR Cement, Louisville Cement Co., Louisville, Ky.
STAR Coal Chutes, Sterling Foundry Co., Sterling, Ill.
STAR Hoists, Hunt, Helm, Ferris & Co., Harvard, Ill.
STARRETT Screw Drivers, Indicator Pliers, Saws, Steel Tapes, Rules, etc., L. S. Starrett Co., Athol, Mass.
STAY RIB Metal Lath, Milwaukee Corrugating Co., Milwaukee.
STAYON Door Hangers & Tracks, F. E. Myers & Bro. Co., Ashland, Ohio.
STEELCOTE Portable Garages, Edwards Mfg. Co., Cincinnati.
STEELCRETE Expanded Metal and Metal Lath, Consolidated Expanded Metal Cos., Braddock, Pa.
STEEL-MAID Kitchen Cabinets, Continental Steel Products Co., Cicero, Ill.
STERLING Transits & Levels, Surveying & Engineering Equipment, Warren-Knight Co., Philadelphia.
STERLING Window Balances, Sterling Window Balance Co., Rochester.
STERLING INDIRECT Radiators, American Radiator Co., New York.
STERLING Wheelbarrows, Sterling Wheelbarrow Co., Milwaukee, Wis.
STEVENS Levels, E. A. Stevens, Newton Falls, Ohio.
STEVENS Measuring Tapes, Keuffel & Esser Co., Hoboken, N. J.
STEWART Concrete Mixers, Stewart Mfg. Co., Waterloo, Iowa.
STONE TEX Cement Paint, Truscon Laboratories, Detroit.
STORM-PROOF Hangers, National Mfg. Co., Sterling, Ill.
STRAIGHT-AWAY Garage Sets, J. E. Porter Corp., Ottawa, Ill.
STRAUB Cinder Concrete Block, Cinder Concrete Corp., New York.
STRUCTOLITE Structural Gypsum, U. S. Gypsum Co., Chicago.
STUCCO-TEX Hydraulic Paint, Truscon Laboratories, Detroit.
STUCCO Waterproof Cement Paint, Truscon Laboratories, Detroit.
SUBSIDO Closets, Crane Company, Chicago.
SUCCESS Concrete Machinery, Concrete Equipment Co., Holland, Mich.
SUPER GIANT Shingles, Richardson Co., Lockland, Ohio.
SUPER-POR-SEAL Transparent Dampproofing for Concrete & Masonry, Truscon Laboratories, Detroit.
SUPERIOR Blue Print Paper, New York Blue Print Paper Co., New York.
SUPERIOR Metal Corner Bead, Milwaukee Corrugating Co., Milwaukee.
SUPERIOR Woodworking Machy., Jones Superior Machine Co., Chicago.
SURBAS Lavatories, Crane Company, Chicago.
SURBOL Lavatories, Crane Company, Chicago.
SURE GRIP Carriers, Door Hangers & Tracks, Hay Forks, Pulleys, F. E. Myers & Bro. Co., Ashland, Ohio.
SURE LOCK Carriers, F. E. Myers & Bro. Co., Ashland, Ohio.
SURETY Composition, Roofing, Philip Carey Mfg. Co., Lockland, Ohio.
SUWANEE Saws, Henry Disston & Sons, Inc., Philadelphia.
SWAN Borers, Bits, Chisels, Gauges, Drivers, Drawers, Knives, Nail Sets, Augers & Drills, Jas. Swan Co., Seymour, Conn.
SWANS CHAMFERER Gauges, Jas. Swan Co., Seymour, Conn.
SYKES Metal Lath, Sykes Metal Lath Co., Niles, Ohio.
SYLVAN Dumbwaiters, Highwood Dumbwaiter Co., Closter, N. J.
SYMMETRIC Stone Crushers, T. L. Smith Co., Milwaukee.
SYNTRON Electric Hammers, National Electric Mfg. Co., Pittsburgh.

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TANDEM Sash Balances, Pullman Mfg. Co., Rochester.
TANNEWITZ Woodworking Machinery, Tannewitz Works, Grand Rapids.
TARINA Baths, Crane Co., Chicago.
TASITE Paint & Varnish Remover, Sherwin-Williams Co., Cleveland, O.
TAXLOXPORE Paints, Toch Bros., New York.
TAYLOR Clamps & Clamp Carriers, Jas. L. Taylor Mfg. Co., Poughkeepsie.
TELSMITH Rock Crushers, Bucket Elevators & Belt Conveyors, Smith Engineering Works, Milwaukee.
TEMPERITE Quick Set & Anti-Freeze for Concrete, Truscon Laboratories, Detroit.
TEN-TEN Door Hangers, Allith-Prouty Co., Danville, Ill.
TEXAS Tapes, Keuffel & Esser Co., Hoboken, N. J.
TEX-TILE Hollow Tile, National Fire Proofing Co., Pittsburgh.
TEXTONE Interior Decorator, U. S. Gypsum Co., Chicago.
THATCHER Boilers & Furnaces, Thatcher Corp., New York.
THE STANDARD Scales, Concrete Mixers, Standard Scale & Supply Co., Pittsburgh.
THESPIAN Drinking Fountains, Crane Company, Chicago.
TIGER BRAND White Rock Finish Mason's & Agricultural Hydrated Lime, Kelley Island Lime & Transport Co., Cleveland.
TINTEX Cement Paint, Reardon Co., St. Louis.
TIP-TOP Tapes, Keuffel & Esser Co., Hoboken, N. J.

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TITELOCK American & Spanish Metal Tile & Shingles, Milwaukee Corrugating Co., Milwaukee.
TOCHSEDO Varnishes, Toch Bros., Inc., New York.
TOCKOLITH Anti-Corrosive Priming Paints for Coating & Preserving Iron & Steel, Toch Bros., Inc., New York.
TOGAN Ready Cut Houses, Togan & Stiles, Inc., Grand Rapids, Mich.
TOLEDO Saws, Henry Disston & Sons, Philadelphia.
TOP NOTCH Sash Pulleys, Grand Rapids Hardware Co., Grand Rapids, Mich.
TORPEDO Ventilating Skylights, Milwaukee Corrugating Co., Milwaukee.
TORREY Spring Door, Sargent & Co., New Haven, Conn.
TOURAINE Fountains, Crane Company, Chicago.
TOXEMONT Integral Waterproofing & Acid Proofing Compound for Concrete, etc., Toch Bros., Inc., New York.
TOXLOXPORE Colorless Damp-proofing for Brick, etc., Toch Bros., Inc., New York.
TRAHERN Pumps and Jacks, Geo. D. Roper Corp., Rockford, Ill.
TRANSIT Levels, Geier & Bluhm, Inc., Troy, N. Y.
TRETON Radiators, U. S. Radiator Corp., Detroit.
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TRIPLE A Floor Surfacing Machines, Triple A Machine Co., Chicago.
TRIPLEX Lavatory Hinges, Chicago Spring Hinge Co., Chicago.
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TRIUMPH Planer, Matcher & Moulder, American Saw Mill Machinery Co., Hackettstown, N. J.
TRIUMPH Saw Sets, Henry Disston & Sons, Philadelphia.
TRIUMPH JR. Self-Closing Faucets, Crane Co., Chicago.
TROUBLE SAVER Brackets, Jacks, Scaffolds, Masons' Trestles, etc., Steel Scaffolding Company, Evansville, Ind.
TRUSCON Metal Lath, Expanded Metal Post Caps, Concrete Reinforcing Materials, Steel Window Sash, Pressed Steel Sill Plates, Angles, Furring Strips, Beams, Platforms, Roofing, Steel Doors, etc., Truscon Steel Company, Youngstown, Ohio.
TRUSCON Dampproofings, Waterproofings, Paints, Varnishes, Enamels and Mill White Paints, Stains and Maintenance Products, Truscon Laboratories, Detroit.
TRUSS-LOOP Metal Lath, Bostwick Steel Lath Co., Niles, Ohio.
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TRUSSIT Fireproofing, General Fireproofing Co., Youngstown, Ohio.
TU-EL Brand, Asphalt Roll Roofing and Shingles, Logan-Long Co., Chicago.
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TWENTIETH CENTURY Barn Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
TWIN SOCKET Plugs, General Electric Co., Schenectady, N. Y.
TYPHOON Pumps, Fairbanks, Morse & Co., Chicago.
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UNION Metal Columns and Lamp Standards, Union Metal Mfg. Co., Canton, Ohio.
UNION Tracing Cloth, Keuffel & Esser Co., Hoboken, N. J.
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UNIT Sash Balances, Pullman Mfg. Co., Rochester.
U. S. Door Hangers, Hunt, Helm & Ferris Co., Harvard, Ill.
U. S. Mineral Wool, U. S. Mineral Wool Co., New York.
U. S. CHAMPION Tile Machinery, L. Hansen Co., Kansas City, Mo.
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UNIVERSAL Cement, Universal Portland Cement Co., Chicago.
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UNIVERSAL Plaster, Universal Gypsum Co., Chicago.
UNIVERSAL Plasterers' Steel Corner Beads, General Fireproofing Co., Youngstown, Ohio.
UNIVERSAL Prepared Finish, U. S. Gypsum Co., Chicago.
UNIVERSAL Rock Crushers, Universal Crusher Co., Cedar Rapids, Iowa.
UNIVERSAL Saws, Henry Disston & Sons, Philadelphia.
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UPSON SELF-CLINCHING Fasteners, Upson Co., Lockport, N. Y.
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V. K. Electric Driven Pumps, Vaile-Kimes Co., Dayton, Ohio.
V. W. Ventilators, V. W. Ventilator Co., Columbus, Ohio.
V. & K. Water Supply Systems, Vaile-Kimes Co., Dayton, Ohio.
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VELVET EDGE Oak Flooring Strips, Arkansas Oak Flooring Co., Pine Bluff, Ark.
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VERDOLITE Marble, C. K. Williams & Co., Easton, Pa.
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VICTOR Gummers, Henry Disston & Sons, Philadelphia.
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VIM CHAMPION Saws, Henry Disston & Sons, Philadelphia.
VINCENT Sinks, Crane Company, Chicago.
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VITROLITE Marble Substitute ("Better Than Marble"), Vitrolite Co., Chicago.
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VULCANITE Roofing and Shingles, Beaver Products Co., Inc., Buffalo.
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W. & B. Tool Cases, Wedell & Boers, Detroit.
WAGNER Flue Stops, Clamps, Clippers, Gauges, Hinges, Ladder and Scaffold Brackets, Latches, Pulls, Sash and Screen Holders, Hangers and Braces, Wagner Mfg. Co., Cedar Falls, Iowa.
WAGNER LEADER Door Hangers, Wagner Mfg. Co., Cedar Falls, Iowa.
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WALSYN Water Closets, Crane Co., Chicago.
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WASHBURNE Sliding Door Locks and Latches, National Mfg. Co., Sterling, Ill.
WATERPROOF Paints, Varnishes, Enamels, Stains, Dampproofings and Waterproofings, Truscon Laboratories, Detroit.
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WEATHER-SHIELDS Paints, Certain-Teed Prod. Corp., New York.
WEISTEEL Closet Partitions, Henry Weis Mfg. Co., Atchison, Kan.
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WESTMINSTER Clocks, American Cuckoo Clock Co., Philadelphia.
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WHITE LILY FINISH Hydrated Lime, Woodville Lime Products Co., Toledo.
WHITE STAR Hydrated Lime, Louisville Cement Co., Louisville, Ky.
WHITE STEEL Bathroom Medicine Cabinets, Mirrors and Toilet Fittings, White Steel Sanitary Furniture Co., Grand Rapids, Mich.
WHITE'S IMPROVED Instruments and Levels, David White Co., Milwaukee.
WHITNEY Frames and Lumber, Whitney Co., Garabaldi, Ore.
WICKWIRE SPENCER Wire Rope, Wickwire Spencer Steel Co., Inc., New York.
WIN-DOR Casement Hardware, Casement Hardware Co., Chicago, Ill.
WINDUSTITE Metal Weatherstrips, American Metal Weatherstrip Co., Grand Rapids, Mich.
WINTHROP Asphalt Shingles, Beckman-Dawson Roofing Co., Chicago.
WISSLER Convertible Levels, Wissler Instrument Co., St. Louis.
WIZARD Saws, Henry Disston & Sons, Philadelphia.
WOCO Doors, Wheeler-Osgood Co., Tacoma, Wash.
WODACK Groovers, Wodack Electric Tool Corp., Chicago.
WOLVERINE Barrows, Contractors' Material, Hoists, Lansing Co., Lansing, Mich.
WOLVERINE Chemical Toilets and Septic Tanks, Dail Steel Products Co., Lansing, Mich.
WOLVERINE Concrete Mixers, Knickerbocker Co., Jackson, Mich.
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WOOD VAR Varnish Stain, Martin-Senour Co., Chicago.
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WOODWORKER'S FRIEND Jointer Heads, Whisler Mfg. Co., Ottumwa, Iowa.
WRICO Lettering Guides, Wood-Regan Instrument Co., Inc., New York.
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XX CENTURY Expanded Metal Lath, North Western Expanded Metal Co., Chicago.
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XYLOLITH Composition Floor Tile, Paul Bencoe, New York.

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Y. P. S. Copper-Steel Basement Windows, Copper-Steel Coal Doors, Youngstown Pressed Steel Co., Warren, Ohio.
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Z Gasoline Engines, Fairbanks, Morse & Co., Chicago.
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ZIP Saws, Henry Disston & Sons, Philadelphia.
ZOURI Safety Key-Set Store Front Construction, Zouri Drawn Metals Co., Chicago Heights, Ill.

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III

Meet the Modern Demands

For a Compact Quickly Accessible "Inador" Ironing Board

The "Inador" makes the door serve three purposes instead of one.

It provides built-in ironing board and utility table, always accessible.

It requires no wall or room space when not in service.

It means that the position of the ironing board and table is limited only by the swing of the door on its hinges.



Rigid in construction. Easily operated and attractive in appearance.

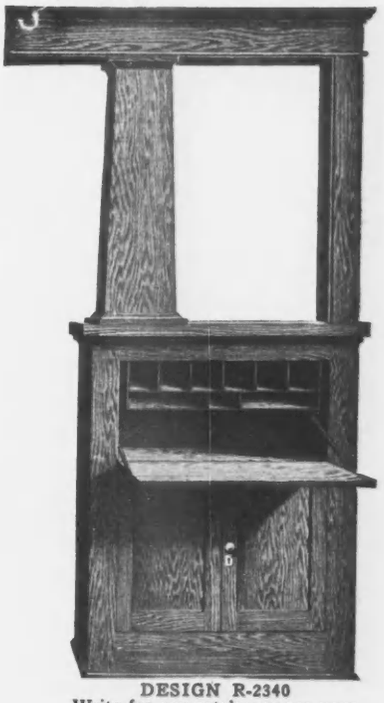


DESIGN 2335
Here is another of attractive and fine finish. Specifications same as one above.

The "Inador" comes fully assembled. No additional installation cost. Low cost, the price is considerably less than the combined price of a standard door and wall ironing board cabinet. Send for pamphlet and full information.

COLONNADES

New in design. Finest in workmanship and finish. The large writing desk shown in the design to the right, facing in the library will prove very useful. Can be used for openings up to 7 ft. high, 10 ft. wide or wider. Pedestals 3 ft. 4 in. wide, 4 ft. 4 in. high without room base; 4 ft. 9 in. high with room base; 11 in. face; paneled back.



DESIGN R-2340
Write for our catalog or see your local dealer for full information of any Roberts product.

& Door Co.
Illinois

ROBERTS SASH & DOOR CO.,
908 W. Cullerton St., Chicago, Ill.

Gentlemen: Please send me full information on Roberts special millwork products.

Name .....

Address .....

City .....

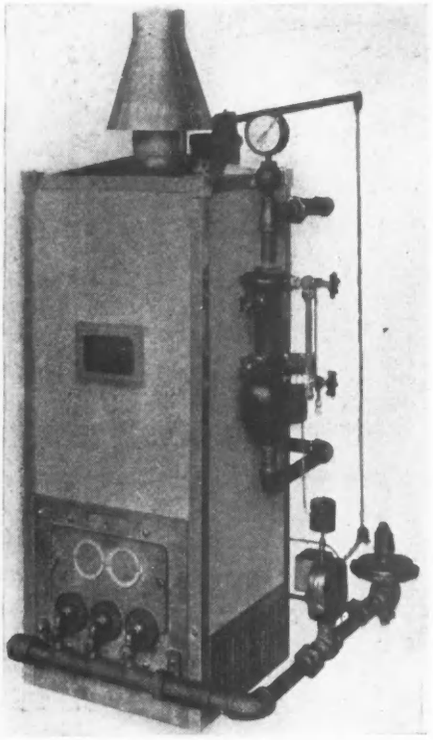
State .....

Dealer's Name.....

What's New?

Automatic Gas Heating Plant

THERE is no question but what the gas heating plant possesses a number of characteristics which recommend it to the home owner who wishes to equip his house for comfort, cleanliness and convenience. No storage space for fuel is required and fuel is only bought as used. There is no dirt and none of the inconveniences of coal or oil deliveries. With the automatically regulated plants which are available, no attention is required except the lighting of the pilot light when cool weather comes and turning it off when heat is no longer required.



This Automatic, Gas-Burning Heating Plant Is Enclosed in an Insulated Aluminum Jacket, Making It Clean and Attractive.

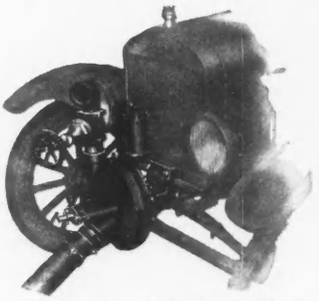
One such plant is enclosed in an insulated aluminum jacket, insuring a permanently clean and attractive covering. The base panel is of cast iron and is quickly removable for cleaning, servicing or inspection. New venturi mixing tubes insure perfect combustion. There is a single connection at the top, requiring less head room and making for easy installation. The front panel is easily removable as a clean-out panel. There is a snap acting gas valve which is leak-proof and positive in action.

With this valve the gas can not be turned on until the pilot light is burning, the gas is automatically cut off if the pilot light goes out and it is also automatically cut off if the water in the steam boilers falls below the safe level. A master control gives a thermostatic regulation, functioning according to variations in steam pressure, water temperature, room thermostat or other controlling devices. An exclusive feature of the low water gas cut-out is the elimination of packed joints and stuffing boxes, thus insuring positive operation through years of service.

The hot gases from the burners flow upward between the water backed walls of the sections of the boiler at a high velocity while the staggered arrangement of extended pins on each section forces these gases to pass in a fine stream over all the heat absorbing surfaces. By the time they reach the top of the boiler and are ready to pass into the flue pipe, every possible bit of heat has been absorbed, with the result that the house is thoroughly warmed with a minimum consumption of gas. The manufacturers state that exhaustive tests have perfected this boiler to a point where it utilizes over 85 per cent of the total heat of the gas burned. This is an exceedingly high figure and indicates an important fuel economy. In the burning of any fuel a large proportion of its heating value is ordinarily lost.

Portable Truck-Operated Pump

A PORTABLE pump which can be easily and quickly attached to cars, trucks and tractors should prove highly useful to general contractors as well as road builders, public works departments and those engaged in irrigation and similar work. The first installation of this pump with its power take-off requires about 1½ hours, and thereafter the pump can be connected or disconnected in two minutes. It is mounted on the frame of the car so that it may be left on the car while driving without breakage or strain.



A Light, Powerful Pump Which Can Be Quickly Connected or Disconnected When Mounted on the Truck.

Where the pump may be used with more than one car or truck a power take-off may be installed on each and the pump connected as desired.

This pump is of the centrifugal type, of minimum weight and yet strong enough to stand the strain of overload. The connection with the car is simple and of strong construction, the pump being driven by means of a floating shaft from the motor. It is made in capacities ranging from 50 to 550 gallons, depending on the engine speed and the discharge pressure. A small hand clutch is used to disengage power units while driving. The pump is equipped with an automatic primer which is simple and sure in action.

✣

Asbestos-Cement Wall Covering

A NEW type of wall covering for bathrooms and toilets has recently been announced which possesses a number of interesting and desirable characteristics. This material, which comes in sheets 4 by 8 feet and 3/16 inch thick, is made of Canadian asbestos and portland cement. This composition makes it absolutely proof against burning and, because it is not highly porous, it does not absorb an excessive amount of paint. Therefore it can be painted quite economically.

It is furnished with press scored blocks 3 by 6 inches in size for bathrooms and, when painted or enameled, gives the effect of tile. It can also be used to advantage as wainscoting and wall lining for homes, garages, schools, kitchens, attics, porches, cellars and for ceilings. It is sanitary, attractive and economical. The cost of the material is not great and it is inexpensive to apply. It can be used either painted or unpainted and can be scrubbed without injury. In addition to its fireproof quality it is also vermin proof.

(*Department Continued to page 758.*)



A Bathroom with Walls Covered with a New Asbestos-Cement Composition Is Proof Against Fire and Is Clean, Sanitary and Attractive.

HIGHEST GRADE BATHROOM OUTFITS COMPLETE AT WHOLESALE

HARDIN-LAVIN NEW EASY WAY



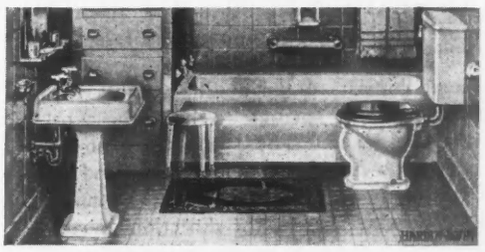
BUY DIRECT

When next in Chicago be our guest at new million dollar plant pronounced the most up-to-date of any of its kind, devoted exclusively to plumbing and heating goods direct from the manufacturer at wholesale. Send coupon below for Free Bargain Catalog and buy under the protection of our guarantee label and bonded guarantee.

The New "CHICAGO" Bathroom Outfit $59.95

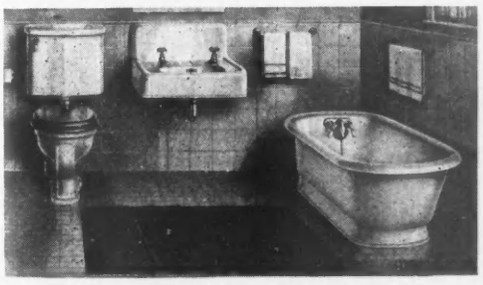
Highest Grade—Complete—Special to Builders

Fixtures furnished with our Chicago bathroom outfit are built along practical and attractive lines, are perfect and of the highest grade that it is possible to MAKE. Shows that FIRST quality Hardin-Lavin products can be had at low costs.



PRESIDENTIAL BATHROOM OUTFIT Special to Builders $118.85

Includes highest quality one-piece cast iron, snow white porcelain enameled double shell recess bath tub. Fixtures and trimming of very latest style. Size 61 in. x 30½ in. x 18 in. Specify right or left connections. Vendom Pedestal Lavatory of cast iron deep apron, heavy white porcelain enameled with most modern faucets, etc. Size 30½ in. x 20 in. x 24½ in. Bowl 18x15 in.
Colonial Closet white vitreous china throughout. New syphon washdown deep seal bowl. Birch mahogany seat. All fittings heavy brass nickel plated.
No. AB-41C—Presidential Bathroom Outfit. Special to builders, with iron pipe connections. Shipping weight, 188 lbs..$118.85



PHILADELPHIA BATHROOM OUTFIT Special to Builders $75.80

Sanitary model, white porcelain enameled, cast iron base roll rim bath tub. Size 60 in. x 30⅜ in. x 21 in. New snow white porcelain enameled, one-piece cast iron lavatory with deep apron. Concealed wall hangers and heavy brass nickelplated fittings. Size 18 x 24½ in. Bowl 12 x 15 in. Specify floor or wall connections. Superior white closet outfit with positive syphon washdown deep seal bowl. Connection and fittings brass nickel plated.
No. AB21—Philadelphia Bathroom Outfit. Special to builders, with iron pipe connections.....$75.80

Deep Apron Lavatory

Late design, white porcelain enameled, cast-iron drop apron lavatory, supported on concealed wall hangers; new low design, china indexed compression faucets, heavy brass nickel plated adjustable supply pipes and trap to floor or wall, size 17x19½ inches, weight 120 pounds.

Chicago AB-11—Lavatory, complete as shown with Iron-Pipe connection. Special to builders.....$12.75

White Closet Outfit

Improved, snow-white, composition Chino closet tank, (beautiful and indestructible); fitted with solid brass elevated noiseless valves and improved china flushing handle. Highest grade white vitreous china syphon washdown bowl. Highly polished, reinforced birch, mahogany seat, with heavy brass, nickelplated bar hinges, flushing ell, supply pipe, closet bolts, etc.; weight 125 pounds.

White Enameled Bathtub

Tub is cast-iron, heavy white porcelain, enameled inside and over the 3¼-inch turned-over rolled rim; outside of tub is painted. This is our newest design, having a pleasing appearance and is the highest grade leg tub manufactured. Fitted complete with heavy brass, nickel-plated compression bath faucet, with china indexed handles, nickelplated heavy brass adjustable waste and overflow and iron pipe tail pieces for bath faucet; width 30¼ inches, length 4½ or 5 feet, weight 300 lbs.

Chicago AB-10—Bathtub complete as shown with iron-pipe connections. Special to builders...$29.95

Chicago AB-13—Bathroom Outfit, complete as shown and described. Special to builders,

$59.95

All shipped out of our Chicago plant same day order is received. Order today and save. You cannot lose.

NEW SWINGING SINK FAUCET



$4.65

New solid brass, heavily nickel-plated combination quick compression double sink faucet. White vitreous handles marked "Hot" and "Cold." Snow white solid china elevated quick removable soap dish with drain. Easy to clean. This fixture is adjustable to fit any sink back. Also furnished without soap dish.
AB325½—Price less soap dish. Shipping weight 7 lbs..$4.65
AB325¾—Price complete as shown. Shipping weight 8 lbs. $5.75

Handy Man Installed His Own. Saved $250

Hardin-Lavin Co.:
A short time ago I got from you a bath room set. I have installed them myself, thanks to your instructions in your Handy Man Book.
I saved $250.00 on the whole thing and everything works fine and looks fine. I want to thank you for the way you filled the order.
John Bray, Holliston, Mass.

Hardin-Lavin Co.:
Thanks for the high grade plumbing furnished me. I am perfectly satisfied with my purchase from your firm. If this communication will be of any benefit, use it.
Howard Meinel,
Elizabethtown, N. Y.

Hardin-Lavin Co.:
I wish to express my entire satisfaction both with the high grade plumbing goods that you furnished and for your very considerate and courteous treatment.
If you care to use my name as a reference you are at liberty to do so.
Magnus Swenson, Madison, Wis.

MAIL THE COUPON FOR BIG FREE CATALOG

We have helped thousands MAKE money as well as SAVE money. Let us help you to do the same.



FREE Bargain Catalog

Gives illustrations, complete descriptions, sizes and wholesale prices on heating outfits of all kinds water supply systems complete bathroom outfits and plumbing supplies, fittings, pipe, etc. All at wholesale.

Send for Your Copy TODAY

Mail Coupon for FREE Bargain Book Today

Represents 50 years of experience in perfecting modern up-to-date plumbing and heating outfits and supplies. Remember everything we sell is backed by our bonded guarantee and carries with it the free help of our trained engineers in planning and installing. Easy terms if you wish. Estimates gladly given without obligation. Send your blueprints or rough sketch to us and our engineers will help you plan guaranteed economy outfits for the exact job.

LAVIN Co.

VISIT OUR NEW PLANT

CHICAGO, ILLINOIS, U. S. A.

Hardin-Lavin Company,
120-30 West Pershing Road,
Chicago, Ill. A.B.-4-26-8

Gentlemen:
Please send me your free bargain catalog with special wholesale prices. I am interested in:

☐ Hot Water Heating Plants ☐ Warm Air Furnaces
☐ Steam Heating Plants ☐ Water Supply Systems
☐ Pipeless Furnace ☐ Bathroom Outfits

NAME.....

ADDRESS.....

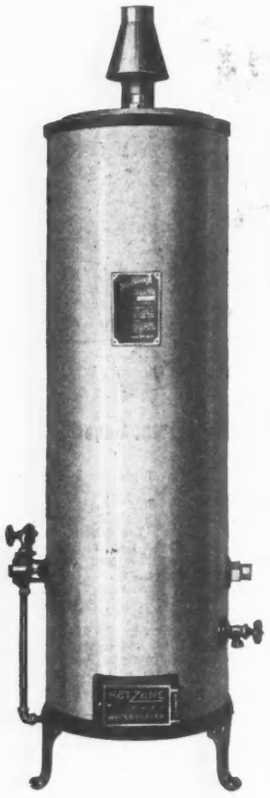
CITY.....STATE.....

See our other advertisements on Pages 755, 756 and 766

What's New?

Dependable Gas Water Heater

DEPENDABILITY is the test of a hot water heater and a constant supply of even temperatured water should be always available with the heater illustrated. This is a gas heater and automatic in action, a thermostatic control turns on the gas when the temperature of the water drops below 140 degrees, either from cooling or from drawing off water, and turns off the gas when the temperature is brought up again. The shut-off of the thermostatic control is gradual in action and never failing.



A Thermostatically Controlled Gas Water Heater Which Assures a Dependable Supply of Hot Water at All Times.

This heater is made in three sizes, with 20, 30 and 50-gallon tanks. The outer shell is of 19 gauge, full finished, steel body stock aluminum lacquered to give it a brilliant finish and reduce the heat radiation. The flue liner is of 20 gauge, lead-coated, terne plate and will withstand the action of combustion products. The joints are lock-seamed for tightness and are closely fitted, top and bottom, for the perfect protection of insulation. Rock wool, especially prepared, is carefully packed between the outer shell and inner terne plate flue for insulation.

The burner is gauzeless and operates efficiently without adjustment over a wide range of gas conditions. It will not flash back nor carbonize and an analysis of the flue gases will show complete combustion. An A. G. A. standard gas cock, with pilot by-pass connection is used and the pilot cock is so adjusted that when the thermostat is closed, flames about ⅜ inch long remain on the burner tips. This gives six pilot lights and insures against the flame blowing out without wasting gas.

A heavy base ring assures rigidity to the whole structure and the legs are extra strong, to stand shipping and erection abuses. The bottom pan encloses the burner, preventing heat losses. The spring closed door is of ample size for access to the burner, but not so large as to cause heat loss. The drain cock is ½ inch, standard, brass, nickel plated, is threaded for standard hose coupling and is high enough to permit draining into a bucket. The water inlet and outlet are of ¾ inch Navy standard bronze, and the gas piping is ⅜ inch. All piping is simple.

✣

It Removes Paint Without Harm

A CRYSTALLINE, chemical compound which is quickly dissolved in either hot or cold water, is guaranteed to remove paint, varnish, shellac, oil, wax, dirt and grease from floors, walls and woodwork without injury to the wood. This compound has the appearance of a white powder, it has no odor and is not explosive under any condition. When dissolved in water, it will not thicken on being exposed to the air.

The solution will not discolor any wood that plain water will not discolor and, in fact, it not only cleans but also bleaches the wood. It will not cause the surface to splinter or damage the fiber of even the finest woods as it attacks the paint only and not the wood.

One pound of this compound will make five gallons of paint remover and it can be used equally well for other purposes. These include the cleaning of paint brushes, keeping them in perfect condition; removing of varnish from furniture; cleaning of kalsomined walls, cleaning of paint stains from clothing without injury to the fabric; and cleaning of windows, hearth stones, sinks, bath tubs and tile work.

✣

Shaper and Router Attachment

A SHAPER head and router attachment has been developed for a well-known woodworking machine which greatly increases its usefulness and makes its owner independent in his work. The two machines added by this one attachment make the woodworker almost universal in its scope.

This attachment embodies all the best principles of the shaper as it is known today. It will make all the cuts that can be made on any shaper up to the capacity of a 4-inch diameter cutter. In addition to this it can be changed instantly into a router by simply removing the shank or arbor that holds the shaper cutter and substituting an arbor to hold the router bit, a change that can be made in less than two minutes.

The fence equipment consists of an auxiliary table with a standard shaper fence, with springs to hold the work down and in against the fence. The springs are so designed that there can be no jumping and no ridges and the resulting cut is perfectly smooth. The cutter can be run in either direction like a regular shaper, the direction of rotation of the spindle being controlled by a spring lever with positive lock. The shaper cutters are held on the shank or arbor by means of a clamping nut and a jam nut. The shank fits in a tapered hole in the spindle and is held in place by a draw-in bolt. To transform the shaper head into router head simply remove the shank or arbor that holds the shaper cutters and put in a shank fitted to hold routing bits. Any kind of routing can be done up to 1½-inch diameter.

✣

Half Bag Mixer Is Improved

THE new model, illustrated here, of a well-known concrete mixer retains all the features which have made it popular in the past and has, in addition, new features which add to its efficiency and ease of operation. This is a guaranteed ½-bag mixer, a size especially adapted to general construction, foundations and sidewalk work. The new model is equipped with a geared dumping device, making its operation easier than before. Instead of a chain drive it is direct gear driven. All gears are of semi-steel, carefully machined and accurately fitted to insure smooth operation.

Low loading, which does away with the necessity of wheeling the material to an unhandy height, combines in this mixer with a dumping height sufficient to discharge into wheelbarrows or any similar receptacles. This mixer is also made in a trailer model, having pneumatic tires and both models are sold on the rental purchase plan if desired.



A Concrete Mixer of a Size Especially Adapted to General Construction, Foundation and Sidewalk Work in an Improved Model.

Frantz Quality
Proves Its Sterling Worth

FRANTZ
TRADE MARK
GUARANTEED BUILDERS' HARDWARE

Distinguish the hardware by the label

Put in Garage Doors that Slide 'Round the Corner

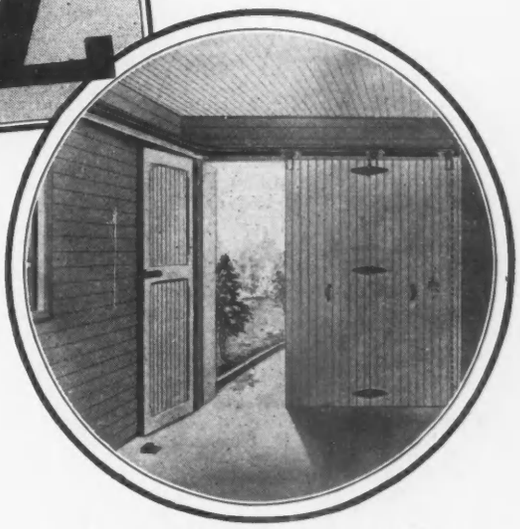
This is the season when spring winds blow garage doors—and when Frantz 15-Y garage sets are in great demand.

Garage doors, mounted with this famous Frantz set, slide 'round the corner, out of the way, with a gentle push. There is no sagging; no exposure to the elements. Winds cannot blow doors off their hinges; frozen ground cannot obstruct them; snows cannot block them.

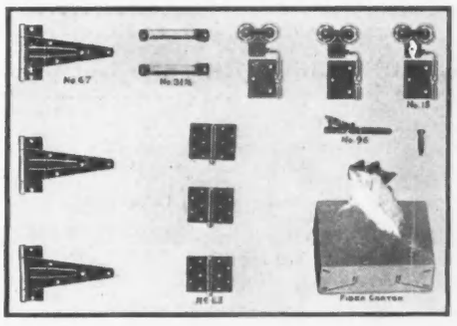
You will find Frantz 15-Y sets very popular. Our local dealer will quote prices.

Frantz Quality Hardware for Houses, Garages and Barns is sold only by our authorized dealer in every city.

Frantz Manufacturing Company
Sterling, Illinois



Garage Equipped With Frantz 15-Y Set
Note the separate passage door. Rolling doors need be moved only when car is taken in or out. Doors fit snugly to jamb, making a weather-proof job. Doors work trouble-free for years and years.



Complete Frantz 15-Y Set
One three-door set in a fibre carton, consisting of: 3 only No. 15 "Runwel" Hangers, with Bolts; 3 only 8-in. No. 67 Special Garage Hinges, with Screws; 3 only No. 63 Flat Back Butt Hinges, with Screws; 2 only No. 206 Floor Guides, with Screws; 2 only No. 31½ Door Pulls, with Screws; 1 only No. 96 Extra Heavy Hinge Hasp, with Screws; all necessary Lags, End Stops for Track and Socket Wrench ..... Weight, 19¼ lbs.

